

*Conservation Education*  
*in*  
*American Colleges*

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*Sponsored by*  
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## THE CONSERVATION FOUNDATION

is an independent organization established to conduct research and to educate. Its work is devoted to the conservation of the earth's natural resources.

## PREFACE

This volume reports the findings of a national survey of the teaching of conservation in the colleges and universities of the United States. All data were collected during the calendar years 1954 and 1955. No comprehensive survey of this sort has previously been undertaken, and the findings which it brings to view are of importance to all who are interested in the development of a constructive national attitude toward the conservation of this country's natural resources.

It is, of course, well known that conservation education occupies no uniform position or status within the colleges and universities of the United States. The subject may be offered in special courses, or it may be incorporated in courses which are otherwise labeled. We have, however, gained a clearer picture as to how widely courses dealing with conservation are scattered throughout a number of existing departments, and how sharply their teaching is influenced by the instructors' previous training and by their personal attitudes toward the subject. We can lay no claim to exhaustiveness in terms of analysis or coverage. This would have required resources of men and money far in excess of those available. We do believe, however, that we have achieved reasonable data reliability as far as the general trends and attitudes are concerned, although we refer in the text to a few areas for which reliability is specifically in doubt. In most instances, our findings, with accompanying discussion, are intended to be provocative rather than definitive.

This study was initiated and financially supported by the Conservation Foundation. As Chapter 4 explains, the bulk of our data was obtained from questionnaires answered by teachers and officials of a wide cross section of the nation's colleges and universities. More data were obtained from official catalogues and other publications of these institutions and from various other documents. In addition, we made personal visits to a number of these institutions. This was done to obtain first-hand views of institutions as functioning units. It is surely unnecessary to stress the point that an institution is



much more than an aggregation of individual teachers, each following his personal inclinations with respect to the subjects he teaches.

Throughout, our aim has been to produce a report as reliable as the exigencies of the situation would permit. Our recommendations for action, in the final chapter, represent opinions which have developed from our familiarity not only with the data we collected but also with many of the institutions included in the survey.

Appreciation is expressed for the encouragement and counsel of the members of the staff of the Conservation Foundation, and to Dr. Stanley Cain of the University of Michigan for counsel in preparing the questionnaire for teachers; also, to the University of Missouri for graciously permitting the survey to be conducted in the quarters provided the Department of Rural Sociology.

Cecil L. Gregory, Instructor in Rural Sociology at the University of Missouri, provided valuable statistical advice in our analysis of certain of that data. Jessie H. Wheeler, Jr., Associate Professor of Geography at the University of Missouri, has earned our thanks for his assistance in editing the original manuscript for publication.

Finally, a word of appreciation is due the many persons attached to the colleges and universities we brought under study. Both their administrators and teachers answered our questionnaires and often attached helpful letters and printed matter. Their interest and the care with which they supplied the requested information must be commended, and it is hoped that this book will in some measure compensate them for the effort.

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June, 1957

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## *PART I*

### *Theoretical and Historical Backgrounds*

# 1

## INTRODUCTION

Conservation of natural resources should be regarded not merely as a technology but as a general social process, taking its place with such other activities as obtaining a living, rearing children, carrying on self-government, and waging war. Various technologies are involved in the practice of conservation, but it should be kept clearly in mind that these are but the tools by means of which the complex social process is carried out.

### *What Is a Resource?*

Conventionally, a resource may be defined as that to which one resorts, or on which one depends, for supply or support. In a more general sense, a resource may be thought of as any available means or capability. It follows that almost anything may be regarded as a resource, under circumstances where it can be used to contribute toward achieving a given objective or end. Thus ideas as well as people and things must be regarded as resources.

At any given period of time the resources available to a people and utilized by them represent a joint function of the environment and of the sociocultural level of the people. If the environment contains no pottery clays, pottery is not likely to be developed. On the other hand, a given environment may be rich in physical and biological materials, but if the prevailing sociocultural level of the people has not been developed to a point where the utility of these materials can be recognized, little use can be made of them. Thus, the American Indian fashioned his arrowheads from flint instead of from the iron that the white man later found here in abundance. And, during the last century, settlers explored this country for gold, unaware that their descendants would re-explore the same territory

for the more valuable uranium, at that time unrecognized and unknown.

The rising sociocultural level of western civilization, with its highly mechanized and industrialized systems of economy, has created a demand for fabulous quantities of physical and biological resources. As a consequence of this situation, considerable concern has arisen in recent years over the possibility of resource exhaustion and the consequent disintegration of the very industrial systems that have made modern levels of living and cultural development feasible. Modern industrial systems are maintained chiefly by the minerals of the earth and the materials supplied by plant and animal life. Although the latter can be reproduced, as yet few, if any of the minerals can be re-used to any extent that is significant for industrial maintenance. Furthermore, it is precisely those needed minerals that, in a reasonably accessible state, usually occur only in limited supply in any given area.

The crux of the problem, therefore, is whether creative science, giving rise to progressively higher levels of scientific technology, can keep pace with the rate at which essential nonreproducible resources, limited in supply, become scarce. If this can be accomplished, then adequate substitute resources may be developed as the supplies of those now in use become exhausted. If it cannot be accomplished, for whatever reasons, then industrial civilizations will suffer and with them the levels of living of the people involved. Apparently there exists in this planet a sufficient supply of such resources as we now know them, plus many others still unknown to us. But the development of techniques necessary for obtaining them at a cost that society can afford to pay may lag.<sup>1</sup> A lag may occur in the development of satisfactory substitutes for exhausted supplies of given resources. The failure of either of these processes alone might not be serious, but the concurrent failure of both could be disastrous, jeopardizing a large portion of our industrial system, and with it the level of living of the people.

The case of the reproducible resources is less complicated and perhaps less serious. Man already knows how to reproduce and maintain these resources. All that is required is for him to provide the facilities and put forth the effort needed to accomplish what now appears to be a clearly necessary task. But whether society will exercise sufficient forethought, and will allocate enough of its resources to the task of developing the scientific knowledge and the corresponding technologies needed to supply the wants of an in-

<sup>1</sup> J. F. Dewhurst and Associates, *America's Needs and Resources* (New York: The Twentieth Century Fund, 1955), chap. 21.

creasing population, is a problem that only future experience can solve. The conservation movement represents an attempt, through resource education, to assist in bringing about a successful solution to the problem.

This study is concerned with certain aspects of the problem of what is being done in the colleges and universities of the United States to acquaint students with the facts regarding natural resources, both reproducible and nonreproducible, and their best use.

### *What Is Conservation?*

The verb "to conserve" is derived from the Latin and the French languages and means *to guard, to preserve, to protect, and to keep in a safe or entire state*. In the United States, the term "conservation" has been used in connection with resources for over half a century. During that time it has come to possess a variety of meanings and connotations—some narrowly restricted in the dictionary sense, but some very broad indeed.

The simplest, and possibly the earliest, meaning given to the term "conservation," in connection with resource use, was of the dictionary sort. When, during the last century, some of the American people saw how rapidly the great virgin forests were being reduced and how quickly the wildlife could disappear when subjected to unregulated hunting for meat, pelts, and fur, it seemed only natural and logical that their reaction should be "save the trees" and "spare the game." They were exponents of conservation in the dictionary sense, attempting to husband the supply of natural resources by using and destroying less of them. It was from this kind of reaction that the conservation movement arose.

But, as time brought perspective and as science developed knowledge of an increasing number and variety of resources and resource substitutes, the connotations of the term "conservation" broadened and deepened. Today one may collect dozens of expressions calculated to explain the meaning of conservation—all with some overlapping, all with something in common, but each with its own distinctive shade of meaning and emphasis. Thus the meaning of the concept "conservation" has undergone a process of evolution during the half century just past.

Even today, the general public most often thinks of conservation in terms of the old concept of limited use, or frugality with resources. In some circles, this view of conservation is considered to be nearly, if not entirely, outmoded; it is still valid, however, as

applied to resources that are limited in quantity and nonrecoverable, and for which no substitute is known.

One may find scattered through the literature of resource use other and more subtle concepts that are related to this notion of frugality of use. One of these is the economists' theory of "time preference," which is concerned with balancing the advantages of present use of resources against the advantages of future use. That is, it may sometimes be better to put off using a resource today in order to have some of it left tomorrow when it may be needed more. This view of resource use is closely akin to the folk concept of "saving for a rainy day."

These notions are applied most often to individuals or small groups such as the family, rather than to society as a whole. Extended to the larger group, they give rise to the cognate concept of trusteeship, i.e., the notion that at any given time the population of any human society is in charge of a valuable estate, consisting not only of the man-made culture that has accumulated, but of the natural resources as well; and that the current generation is morally obligated to keep these resources intact as far as possible and pass them on for the use of the next generation. Thus, a farmer may hesitate to misuse his land, in order that his son who will succeed him may receive it in good condition. Insofar as renewable resources are involved, this means that the farmer must undertake to replace such resources at a rate approximately equal to the rate at which they are being used. In a society where occupational mobility is low and where farms are likely to remain in the same family for several generations, such a plan may work reasonably well in practice. However, in a society such as ours, in which occupational mobility is high and it is less likely that the son will succeed his father on the same farm, the motivation for such a plan tends to be less compulsive.

One variation of the idea of trusteeship is the notion that the natural resources possessed by a society belong to the whole society—that they are "community property," as it were, rather than the property of particular individuals or groups, and that no private groups should use them recklessly and solely for their own benefit. For its realization, such a concept of conservation implies either an all-powerful agency for the control of individual and subgroup behavior in the interests of conservation, or the possession by all the people of a social conscience, and an awareness of social destiny, that up to now would appear to be rare, if not entirely unknown.

Many definitions of conservation place no emphasis upon the preservation and hoarding of resources, as such, but tend to em-



phasize their wise use, which among other things presumably means their use without waste and for some purposeful end. Such a concept obviously has some merit: one would not burn a forest for the thrill or cut a fine tree to hear it fall. But even so, the concept leaves much to be desired.

What constitutes "wise use"? At what point in the use continuum does unwise use become wise use? By whose judgment is a given act of resource use to be classified as wise or unwise? Is the elimination of sheer waste and wayward acts involving resources sufficient? Is what is regarded as wise use today likely to be so regarded tomorrow? Is emergency use to be classified as wise use? If so, what constitutes an emergency of sufficient magnitude that it may justify the over-use of dwindling resources? Extreme illustrations help but little. The most rapid exhaustion of resources takes place not in the desperate situations in which their use is obviously necessary, but in the far more frequently occurring situations in which a plausible case may be made out to justify their use.

Undoubtedly most of those who advocate "wise use" of resources have in mind not merely justification of the act on the basis of the nature of the current situation but also the notion that it is wise to use resources sparingly with an eye to future needs; how, indeed, could disregard of the future be considered "wise"? Human history shows that progress from the savage to the so-called civilized state may be measured to a considerable extent by man's ability not only to develop some surplus of resources but also to practice sufficient restraint of resource consumption that he may not wallow in surplus today and feel the pinch of scarcity tomorrow.

Obviously, the wise use concept does not apply only to individual behavior. Man lives in groups, and groups make up societies, nations, and peoples. Hence, wise use of resources must be the duty equally of individuals, groups, and large societies, depending upon the circumstances. But if the societal point of view is taken, one can hardly consider only the welfare of the current generation and completely ignore the welfare of the next, for such behavior might well result in the extinction of the entire society. Consequently, one may deduce that wise use of resources must mean their use without waste for the benefit and welfare of all the people, both today and in the future. But how the pressure of current needs can be resolved in the light of anticipated future needs and how the resulting program can be successfully implemented, the proponents of this view do not venture to state.

One aspect of the wise use concept is that of "resource management." Many who have given thought to the subject believe that

wise use of resources is impossible without planned management. Apparently this consists of taking societal forethought, of balancing alternative claims upon resources against each other, and the total claims against the estimated resource supply. Resource management must thus become a special societal function, and some group of persons with specialized knowledge acquired for the purpose must be given responsibility for the management of resources. Under such a plan, the specialized personnel could become well informed concerning the supply of resources including protection of the supply, the best ways to make such resources available for use, and how to prevent waste. Such a specialized group might also serve a necessary function by way of educating the entire society in the proper use of resources. However, in a democratic society, the final determination of how the resources are to be used and how they should be allocated to the various proposed uses must remain in the hands of the society as a whole, or at least in the hands of others than those managing the resources, else it might come to pass that the society itself would be managed rather than merely its resources.

Certainly resource management by a specialized personnel represents a laudable attempt to introduce more orderly procedures into the general process of resource use. But it must not be regarded as a complete solution of all the difficulties facing a society that makes heavy demands upon its resources and finds them in limited supply. Delegation of authority to a trained personnel skilled in the management of resources is not likely to guarantee that resources will be allocated to the most worthy causes. Neither is it likely to provide a mechanism that can effectively resist the social pressures to spend resources extravagantly during periods of social crisis, or in periods of social hysteria. However, so far as renewable resources are concerned, management by a skilled and socially responsible personnel would appear to be indispensable for continued societal welfare. For insofar as resources are either recoverable or renewable, such skilled and devoted personnel can insure that even while resources are being consumed the supply is being replenished in part, thereby postponing the day when society might have to accept the consequences of serious resource depletion.

Such a capable, dedicated personnel can be obtained if properly trained and rewarded, but ignorance and indifference on the part of society may result in lack of support for the devoted specialists, and eventual discouragement. Hence, in a democracy it is essential that the entire citizenry be kept informed of the general resource situation and its problems. It would seem that this can be

done only by making conservation education a part of the general educational system.

It may be that there are those who, noting that a higher level of rationality apparently prevails among those peoples who possess the higher and more complex cultures, will argue that in the course of cultural development man will finally achieve a level of rationality with respect to resource use that will enable him not only to manage his resources scientifically but to utilize them wisely as well. We shall neither deny nor affirm such a possibility. However, at present it appears to be somewhat beyond the level of practicality.

By way of contrast, there exists a school of thought which holds that man has never learned how to live and let live on this globe, and that his continued failure to do so may eventually result in his downfall. This might be styled the "ethical conservationist" view as contrasted to the "utilitarian conservationist" view. Its protagonists believe that nature should be preserved as far as possible in its *present* state if man is to survive indefinitely. Man, they say, believes that the world is made *for him*, and that all other forms exist to serve his purposes. Hence, he believes in utilizing them as far as possible and destroying those that appear to be of no use to him. Under such circumstances, conservation is not enough, since it only slows, or delays, the process of making the world uninhabitable.

According to this school of thought, man's relation to the earth is primarily an ethical one. "To live healthily and successfully on the land, we must also live with it. . . . Unless we share this terrestrial globe with creatures other than ourselves, we shall not be able to live on it for long."<sup>2</sup>

There is more than a grain of truth in this view, but one need not repudiate the utilitarian view in order to admit it. The more we come to know about functional relationships and ecology, the clearer it becomes that man is part of the "web of life" on this planet and cannot live in isolation.

So far we have been discussing the concept of conservation as applied to situations where resources are regarded as occurring in fixed supply. But, with the development of science and its application to the problems of natural resources and their use, the notion of the meaning of conservation has broadened considerably. Before the inductive and analytical methods of science began to illuminate the field of material resources, the supply of such resources could only be regarded as fixed. Hence, they must be used sparingly, doled out, saved for an emergency and the next generation. But

<sup>2</sup> Joseph Wood Krutch, "Conservation Is Not Enough," *American Forests*, Vol. 61, pp. 30-31, July, 1955.

science has destroyed such narrow thinking once and for all. Henceforth, according to science, natural resources are to be thought of not only in terms of existing substances, but also in terms of elements that exist in nature in various forms and combinations and that may be isolated and recombined by man, whenever his rising scientific intelligence and skill permits, to form new substances with properties, and therefore uses, not previously found in nature. The future of this new approach to resource use is still a debatable question. There are those who believe that we now stand in the doorway to a new era which in a sense will represent a new world—a world in which the magic of physical and biological science will create all the animate and inanimate resources that man may need to complete the conquest of his environment and to establish his desired level of living. On the other hand, there are those who feel that such an enchanting outlook may prove to be only a mirage and that we are not yet justified in emptying our present pools of primary wealth before we have learned to replenish them.

One of the most helpful contributions of scientific thought with respect to resources has been a classification based upon their permanence under use. The first major group in this classification consist of those resources, occurring in limited supply, that when once used are not only nonrenewable but also nonrecoverable. If one of these happens to be a strategic one in the scheme of civilization, the only possible solution is to dole out the supply and attempt to find a suitable substitute quickly. In the case of a material that occurs in very limited supply and is at the same time very strategic as to use, such a situation may easily precipitate a social crisis. However, if the material happens to be recoverable after having been used, as in the case of steel, a crisis may be long deferred by zealous effort at recovery and reconditioning, plus an industrious search for substitutes.

The second major group in the classification consists of those natural resources that, whether existing in limited or abundant supply, are capable of being renewed. This category includes all plant and animal life as well as that very essential combination of the organic and the inorganic resources, soil. These renewable resources vary greatly in the length of time required to reproduce them; some, such as wheat or corn, require only a few months; others, such as a giant tree, require many years—so long indeed that scarcely any individual can afford the waiting period necessary to produce them, so that their reproduction becomes a group function. The significant thing, however, is that this group of resources can be reproduced, and hence may be kept in perpetual supply if the

people are willing to spend enough time and to employ the skilled personnel necessary to propagate and protect them.

The fact that this latter class of resources is renewable provides a welcome alternative to the search for satisfactory substitutes. Renewal techniques may be used to increase the supply of a dwindling resource, so that only in cases where the demand comes to exceed the sum of the original supply and the increment provided by means of renewal techniques does it become necessary for a portion of the population to adopt a substitute. A resource that is renewed as fast as it is used, both quantitatively and qualitatively, is said to be on a sustained yield basis. This is regarded by experts in the field as perfect conservation, since it provides for a predictable annual consumption with no prospect of decrease in rate. Modern societies are struggling to place timber as a resource upon this basis.

Another aspect of resource use that is sometimes included in the concept of conservation is the possibility of improving upon the state of nature. Every student of natural science knows that man, with his scientific equipment is frequently able to change natural conditions and processes so as to satisfy his wants more fully. One of the commonest illustrations of this ability is the metamorphosis of a semi-arid, relatively unproductive area into highly productive land by irrigation. Another is selective plant and animal breeding, in which the resulting offspring is superior in certain desired respects to the parents; for example, hybrid corn. A final illustration is chemical synthesis, in which substances are broken down and certain elements recombined to produce a new synthetic substance with desirable properties not previously found in nature.

These processes may not properly be included in the concept "conservation" as it has developed historically. However, improving upon the state of nature is rapidly becoming an important aspect of the general problem of resource use. More and more, man is learning to find not only new sources of needed materials but new sources of energy as well. The full meaning of the new vista opening up before us is not yet comprehended by very many people. Whether it will gradually lead to an easing of the pressure upon traditionally known resources to the extent that the fear of resource exhaustion will be largely overcome, or whether the apparent promise will greatly exceed the possibilities of realization, remains to be determined. But for purposes of definition, it seems essential that the role of creative science in extending the number and variety of resources and resource uses must be incorporated into the concept of conservation that we hold today. In a very real

sense, scientific development brings to the concept a positive approach that has been too long lacking. It offers hope that the future of man promises more than an existence characterized by an eventual decline of resources and a lower level of living. In a measure, it shifts the focus of attention from resources *per se* to the rate of growth of the human population and the time that may remain before all attempts at scientific advancement are dissipated in the struggle for the bare essentials of existence.<sup>3</sup>

Since the days of Malthus, it has been recognized that the human potential for increase presents a constant threat to man's ambition to rise above his poverty. With the gradual disappearance of the land frontier, some persons have believed that population might in time exceed the means of subsistence and Malthus' positive checks would begin to function on a large scale. Recently, however, it has begun to appear that the past high rates of population increase are not inevitable. Some peoples have succeeded in lowering and stabilizing the death rate to such an extent that the birth rate has become the chief factor in natural increase; some of them have also achieved voluntary control of the birth rate, so that it tends to vary with prosperity. These peoples have achieved a relatively high level of living, and have apparently become so committed to it that, if necessary, they will sacrifice the birth rate in order to retain it. If so, they are less likely to have a high natural population increase in the future. Indeed, if subsistence becomes scarce, their population may not increase at all. If this degree of control could be extended to the majority of the peoples of the world who do not now possess it, the much-discussed race between science and famine might conceivably become a topic of purely historical interest.

Today, perhaps a majority of the peoples of the world live under the constant threat of positive population checks. Birth rates, not under voluntary control, are high, and tend to remain relatively constant. Death rates, uncontrolled, are also high, and tend to fluctuate with the level of subsistence. Alternating periods of high natural increase and no natural increase come and go in the wake of prosperity and famine. Under these circumstances, the death rate is the chief determinant of natural increase.<sup>4</sup> If scientific con-

<sup>3</sup> Charles E. Lively, "Some Reflections on the Conservation Movement," *Transactions of the Eighteenth North American Wildlife Conference*, 1953, pp. 40-41.

<sup>4</sup> Warren H. Thompson, *Population Problems*, McGraw-Hill, 1953, fourth ed., pp. 267-272.

trol of the death rate can be achieved by these peoples as it was by those described above, and if voluntary control of the birth rate in the interest of obtaining a higher level of living can also be achieved, science may receive the support and be given the time required to keep production ahead of population growth and thus permanently thwart the operation of the dreaded positive checks to population.

### *Education in Conservation*

The beginnings of interest in conservation of natural resources in the United States can be traced as far back as the colonial period. The so-called "conservation movement" had its inception during the decade of the 1870's, but it did not get fully under way until the first decade of the present century. With the conservation movement came conservation education—first for specific occupational and vocational purposes, and only later for purposes of general education. Beginning in certain of the major universities of the nation, conservation education gradually spread among the various institutions of higher learning.

The teachers' colleges were especially inclined to incorporate conservation education into their curricula for the preparation of teachers for the elementary and secondary schools, and as a result much conservation teaching now occurs at these levels, although it is by no means universal. Higher education has seemed less concerned. The land-grant colleges and universities have been conspicuous for their interest in conservation for many years, as have many other colleges and universities. However, approximately half of the colleges and universities of the nation offer little or nothing by way of conservation education, and the notion that conservation is an appropriate, even desirable subject for general education seems not yet to be fully accepted.

Although conservation, particularly in its technical aspects, has been written about extensively during the last quarter-century, its history is not yet well known. Large numbers of people are still confused about its theory and philosophy. This must be taken into account by writers who would deal with the subject from a general point of view. Consequently, realizing that many persons not versed in conservation fact and theory may read this report, the authors have felt it advisable to devote the first three chapters to historical and theoretical orientation. While they lay no claim to completeness of coverage, they hope that these chapters may serve as an adequate introduction to the body of the report.

### *The Tasks of Conservation*

At this point we return to the question, "What is conservation?" We have seen that historically a number of different points of view have developed, none of which seems to be entirely adequate for current use. Is it possible to restate the case so as to incorporate present knowledge and current outlook, and thereby lend greater vitality to a concept that so far has had little public appeal? The stakes are high enough to make it worth a try.

Conservation is a complex concept. As a social objective, it involves a number of lesser objectives which, for the purpose at hand, may be stated in terms of tasks to be performed. That is to say, any society may practice conservation by incorporating the following tasks into its work agenda and seeing to it that they are carried out.

1. Maintain a thorough knowledge of the supply of natural resources available, insofar as the current level of technology will permit.

2. Husband carefully those essential resources in short supply and, following their use, effect recovery of as much of them as may be physically and/or economically possible.

3. Exert sufficient effort to replace renewable resources at a rate equal to consumption.

4. Estimate continuously the rate of growth of the population and changes in its composition, and thus anticipate its needs in terms of resources.

5. Develop scientific technology at a rate that will enable the level of consumable supplies fabricated from the utilization of previously known resources and from newly discovered or invented resources to be maintained at an optimum.

6. Educate the people to understand the necessity of keeping a balance between consumption and availability of supplies so that when and where necessary they may voluntarily adjust the factors affecting demand, including population increase, to the outlook for consumption.

7. Recognize clearly that nature may not with safety be recklessly despoiled: that by disrupting the complicated ecological relationships existing in nature, before he has the knowledge to compensate permanently for such change, man may be making a fatal blunder.

In the present state of knowledge, these tasks may be regarded as representing a fairly complete societal program of conservation



of natural resources. If a program involving the conservation of human resources were included, some additional tasks would of course have to be incorporated in the list. It should be noted that a society which is concerned with something less than this list of tasks must be regarded as practicing only partial conservation.

We may now combine the concepts implied by these seven societal tasks into a single general statement. If the tasks have been accurately and completely stated and if the general statement based thereon reliably represents them, then the latter should represent a fair definition of conservation. The following represents an attempt at such a statement:

In a dynamic society, conservation consists of balancing the use of natural resources and the varying demands of population in such a manner that existing resource supplies will not become exhausted before adequate substitute supplies have been discovered or invented and made available for use.

## 2

# THE CONSERVATION MOVEMENT IN THE UNITED STATES

### *Social and Economic Background*

The economic and social position of the American people with respect to natural resources during the seventeenth and eighteenth centuries is now fairly well understood. The early settlers found here a country abounding in natural resources of unusual richness and variety. Coming as most of them did from middle and lower levels in European society, poor but ambitious, nursing a longing to be independent with a home on the land, they looked upon America as a paradise in the making. It is true that they experienced some difficulty in adapting themselves to their new environment, but they borrowed heavily from the practices of the American Indian and gradually modified their European knowledge to fit the conditions of the new country.

As the economy of the colonies rose above the subsistence level, the settlers began to seek a market for their surplus products, while at the same time there grew up an increased demand for more capital and equipment to develop the new country. Hence, a mutually advantageous trade sprang up between the colonies and their European homeland—a trade by which the necessary financing of American development was paid for with products drawn from the natural resources of the new country. Timber, needed in England for ship construction, was one of the first products to be used in this trade. It was already grown and ready for harvest and all that was necessary was to appropriate it from nature. Agricultural products were also needed in the European trade, and crops such as tobacco were grown upon cleared land until the fertility of the

soil began to wane. The growers then abandoned the exhausted land and moved on to new clearings.

Thus did the newcomers to America advance into the interior. They cut the timber to build houses and cities, to ship abroad, and to make way for field crops which they raised for food and fiber and for export. They hunted the wildlife for meat, pelts, furs, and down. And since as they looked westward they could see no end to such resources, the notion of restraint in resource use scarcely occurred to them. Indeed, their zeal for exploitation in the face of such abundance often led to excesses. Thus the firehunt practiced by the Indians was adopted by the settlers and used for taking game as late as 1748. Timber was ringed, cut, and burned to clear the land for farming. Setting fire to the woods and marshes in the spring of the year to provide better grazing and to "rid the woods of varmints" was prevalent in Pennsylvania around 1700 and has persisted in certain areas, notably the Ozark highlands, until recent years. Fish were caught by the boatload and left to rot on the shore, and bison were slaughtered for a tongue or a steak, or simply for fun.

Although immigrant settlers hungry for land poured into the United States in large numbers after 1840, the factor of greatest significance from the standpoint of resource exploitation was the development of the scientific and mechanical revolution. Peoples with a preindustrial culture do not consume natural resources rapidly. It would have taken the immigrants a very long time to have made serious inroads upon the resources of this continent had they been armed only with axes and wooden plows. But before they were fairly settled in the Middle West, where the stiff sod offered much resistance to cultivation, the John Deere steel plow had appeared on the market.<sup>1</sup> The McCormick reaper was patented in 1833, and the mowing machine followed in 1842. Thus the basic tools for land exploitation were supplied within a decade. Other mechanical devices appeared rapidly.

Before 1860 canal-building had been abandoned and railroad-building was under way. By the beginning of the Civil War, every eastern city of importance was a market center and the railroads were expanding westward as rapidly as possible, for they were needed to transport the settlers to the new lands and to transport the growing flood of products from field, forest, and mine to eastern cities and to the seaboard for shipment to Europe. And so began a period of competition between farmers and industrialists for participation in the benefits of resource exploitation and for governmental assistance.

<sup>1</sup> That was in 1837. The Oliver chilled-steel plow did not appear until 1855.

The railroads shared heavily in the division of natural resources. To aid them in the extension of their systems, the federal government, between 1850 and 1870, gave the railroads approximately 129 million acres of land. The heaviest grants went to the Union Pacific and Northern Pacific systems, with the Southern Pacific and Atlantic and Pacific systems sharing heavily also. These grants were generally provided as strips for right-of-way extending a specified distance on either side from the track.

The commercial lumber companies also shared heavily in the benefits of virgin resources, chiefly timber and timber lands. Although the land laws favored the settlers, the federal land office was scarcely in a position to supervise such extensive areas and transactions, and many irregularities occurred, often to the great benefit of lumber corporations.

The close of the Civil War ushered in a quarter-century of great significance for resources and resource use. The nation was on the verge of industrialization and urban growth. However, the South was bankrupt and the country devastated. The plantations were without funds or labor, and the introduction of the share-cropping system as a recovery device proved useful to both landowners and liberated slaves. But reconstruction proved to be a long, hard task, during which agricultural resources suffered heavily.

In the meantime, the North, virtually untouched by the fighting, recovered almost immediately and turned to the tasks of western development, urban expansion, and industrialization. The first of these involved the extensive migration of population westward, the settlement of the high plains previously passed over as unfit for human habitation, the rise and fall of the mineral empire and the cattle empire, and the organization of a dozen new states.

For a time following the Civil War the "cattle kingdom" tended to monopolize the high plains area. Cattle had been produced for many years on the southwestern plains, but it was not until after the War that they came to be fattened for market on the grass of the northern plains. The coming of the railroad to that area made it a simple matter to ship the meat east by refrigerator car, which was in use by 1875. Between 1866 and 1888, some six million cattle were handled in this way. But although the cattlemen fenced the range land and exerted every effort to keep control of it, the pressure of the farmer-settlers—backed by the authority of the federal government—was too great. Also, cattle diseases and drought were discouraging factors, and the settlers had taken control by 1890. With too little land for a homestead, however, it was to be a discouraging effort for the farmers. Many soon sold out to the nearest

cattle ranchman, who then held title to the land he had previously fenced illegally. Thus, many ranchers were able to survive. Many settlers, discouraged by drought and locusts, abandoned their homesteads and returned to the East.

Along with the rise and fall of the cattle kingdom came the rush west for mineral wealth. Following the California gold rush, gold and silver were discovered in Colorado, Nevada, Idaho, Montana, and Wyoming. Prospectors and adventurers roamed the territory, pushed the Indians aside, and paved the way for land settlement. Between the years 1860 and 1890, their mines produced an estimated \$1,241,827,000 worth of gold and \$901,160,000 of silver. By the latter date these sources of mineral wealth were on the decline.

The industrialization process that got under way following the Civil War was revolutionary in character. It was based largely upon the exploitation of such natural resources as iron ore, coal, oil, natural gas, copper, gold, and silver, all of which were produced in abundance from newly discovered fields. Some of the factors that made this exploitation possible were (1) the application of science to the invention of devices to aid in the mining and processing of mineral wealth, (2) an adequate labor force supplied by the rapid increase of the native population and by foreign immigration, (3) the development of railway transport, (4) the creation of capital and the power to borrow, and (5) the growing domestic and foreign markets.

The number of inventions per year began to rise sharply about 1850 and continued high until after 1930; during that period the total number of inventions, designs, and reissues rose from 6,000 to 256,000. The newly opened iron ore mines of the Lake Superior area provided an abundance of iron, and the inventive genius of Bessemer and others made steel comparatively cheap. The rise of powerful trusts and monopolies was so rapid and their operations so effective that the Sherman Anti-Trust Act was passed by Congress in 1890.

While industrialization was getting under way and cities were increasing both in number and in size, agriculture was expanding also. Between 1860 and 1910 the number of farms trebled and the acreage in farms more than doubled. The farm population, although declining as a proportion of the total population, was increasing rapidly through immigration and migration to the land frontier. By 1890 the farm population is estimated to have reached more than 30 million persons. After a period of relative stability, the farm population began a gradual decline about 1910 and estab-

lished a trend that has continued to date except for the depression decade, 1930-40.

With the increase of farm population and farm acreage, the farm products also increased to a volume ample to supply the growing urban population and still leave supplies for export. The exploitation of virgin lands in the West brought cheap agricultural product eastward, tending further to demoralize agriculture in the East, where soil fertility was already declining. Many eastern farms were abandoned in favor of new lands to the west.

But in spite of its expansion to new lands, all was not well with agriculture. Soil erosion and soil exhaustion had begun to plague the farmers of New England and those of the southeastern states where constant cropping with cotton and tobacco had begun to take their toll. Overexpansion and financial depressions had brought low prices. Drought had broken and discouraged many farmers, especially in those western areas where the methods of humid agriculture were not adapted to the semiarid conditions. Farm costs were rising, and mortgage indebtedness and tenancy were high. Under these circumstances, it is small wonder that farmers became dissatisfied and looked for a solution to their problems. In the process, they tried collective effort to combat their economic and political difficulties.

The first attempt at organized effort to solve the problems of agriculture began in 1867 with the formation of the Patrons of Husbandry, commonly known as the Grange. It was founded as a general farmers' organization with a fraternal type of structure, but almost immediately it centered its program upon the economic and political problems facing agriculture. The organization grew rapidly and became a powerful movement during the first decade of its existence, but its entire rise and fall took place in a period of fifteen years. Near the end of the century the Grange began to revive and started upon a steady program of development that has brought it up to the present as one of the major national farm organizations.

During the early history of the Grange, its interest centered in such problems as prices, markets, railroad rates, and monopolies, with some attention to preservation of natural resources. Since the decline of its early interest in politics, the Grange has given more attention to such matters as conservation. It has opposed wasteful exploitation of forest resources, favored establishing the U.S. Geological Survey and the national and state reservations and parks, and supported the Clark-McNary Act of 1924, which among other things encouraged timber production and provided for expansion

of national forest areas. Theodore Roosevelt often consulted with Grange leaders on conservation while he was President, and Gifford Pinchot was a lifelong member of the organization.

The Grange was replaced during the decade 1880-90 by the Farmers' Alliance, also short-lived as a farmers' movement. It merged with the Populist party about 1890 and went down with that party. Both the Farmers' Educational and Cooperative Union and the American Society of Equity were organized in 1902. Neither started a spectacular movement for economic and political reform in the interests of agriculture, as had the Grange and the Farmers' Alliance. The American Farm Bureau Federation was not formed until 1919, although it had its beginnings much earlier in the form of county farm bureaus organized to assist the County Extension Agent in his job of agricultural education. With the exception of the Farmers' Alliance, which was not particularly concerned with conservation, the later farm organizations did not appear until the conservation movement was under way.

In the decade 1890-1900, farmers in general began to display evidence of interest in the problem of maintaining the fertility of their soil. The solution of this problem for the farmers in New England and the Southeastern states, where erosion added to soil depletion, had been in movement to new land at the frontier until arable lands were no longer available at frontier rates. This movement was aided considerably by the Carey Act of 1894 and the Reclamation Act of 1902, opening for settlement much additional land, mostly in the West, that could be reclaimed for settlement by irrigation.

By the time the westward movement had spent its force, which was about 1900, some 100 million acres of land had been rendered unfit for crop production, and some 200 million acres more were badly eroded. The grasslands of the high plains had been grazed to a near desert, the eastern forests were fast disappearing, and the cumulative effects of flagrant resource use had become manifest.

Scientific agriculture could make little headway until free land was gone and its virgin fertility well exploited. Soil science was still in its infancy, and the farmers who tilled the land were almost completely uninformed about it. Nevertheless, they belived in education and they wanted to share in it. Largely in response to farmer demand, what was to become the U.S. Department of Agriculture was established in 1862 and along with it the land-grant colleges of agriculture. These colleges were expected to provide agricultural education for the farm population, but there were few teachers of agriculture and no laboratories or experimental grounds for research. It was not until 1887, when the agricultural experiment stations

were established, that scientific agriculture really got under way. In 1914 the Agricultural Extension Service was established to carry the principles of scientific agriculture to the farmers by means of the Extension Agent system. The story of the growth of scientific agriculture in the United States is to be found largely in the history of these institutions. It is a story that includes the application of conservation practices to check erosion and to build up the declining fertility of the soil.

The two world wars brought unprecedented exploitation of natural resources, both renewable and nonrenewable. Iron, oil, and other strategic minerals were used and wasted lavishly. Timber was cut at a rate far in excess of the rate of growth. Marginal and sub-marginal lands were brought under cultivation with the slogan, "Food will win the war," and the foundation for the modern dust bowls was laid. Also, the urge to bring new land under cultivation resulted in a move, starting about 1910, to drain lakes, swamps, and wet lands; and during the next twenty years much land was thus reclaimed for cultivation. But although much good cropland was provided by this procedure, the blow dealt to wildlife, particularly to migratory waterfowl through destruction of habitat, was so severe that it did not recover for many years. Refuges are still being created by way of compensation.

With this brief background, we now turn to the conservation movement itself.

### *Rise of the Conservation Movement*

Prior to the scientific age human societies were relatively localized both in thought and movement. Cultures arose, blossomed, and fell in one general locality characterized by a particular environment—whether deep alluvial soil, a rolling grassland, heavily forested hills, or semidesert. Through long periods of time each society learned by laborious trial and error how to survive in its particular habitat. Each knew relatively little about the techniques necessary for survival in other types of environment. But with the rise of the scientific and mechanical age and the consequent movements of peoples to other parts of the world, questions of survival had to be faced anew. Under such circumstances the migrants could either adopt the survival practices of the natives, or attempt to adapt their own habits and methods to the new situation.

Our European ancestors who came to America were accustomed to the techniques of survival that had been developed for the environment of western Europe. Here in America they were con-



fronted with strange climatic conditions, different soil types, and novel products of the soil. Inevitably, the standards of judgment they used in selecting land were often wrong, and sometimes disaster resulted.

As a result partly of the hurried mass movement to the frontier and partly of the federal land laws, the settlement of much, perhaps most, of the land of the United States was accomplished in a highly individualistic way. The family was the unit of occupancy, and each family moved and selected its homestead according to the best judgment of its members. Organized society was at a minimum. Mutual aid was freely practiced among neighbors, and local institutions such as school and church sprang up quickly, but local government was weak, and voluntary associations beyond the local level were slow to appear. When a family made a bad choice of land or when the farm resources began to dwindle, the family had little choice but to accept the consequences or try to locate another homestead elsewhere.

So long as the people could neither see the end of the land frontier nor visualize the limits of the forest resources, and so long as every family dissatisfied with its depleted homestead could move to a new and more promising one, there could be no conservation movement. Although individuals here and there began to be aware of the misuse and waste of resources nothing effective could be done because the necessary mechanisms for social action were not at hand. There were no leaders who understood what to do, knew how to go about initiating social action, and understood how to provide the organized mechanisms through which to operate. Hence, the conservation movement could not have arisen to the stature of a national force molding national policies prior to the resource crisis that began to develop during the thirty-year period following the Civil War. Evidences of this crisis developed rapidly because of the disappearance of the land frontier and the development of the numerous scientific and mechanical devices for wholesale and rapid exploitation of natural resources. Had the latter development not occurred, so that the settlers of the land were forced to continue with their semiprimitive colonial methods of resource exploitation, the conservation movement might never have matured.

Although conservation measures had made considerable progress in Europe by the time the great stream of settlers from there began to penetrate the interior of the North American continent, it seems probable that the sheer abundance of resources that confronted them here would have led them to feel that such measures were

unnecessary. It is true that, at various times and places, these settlers employed legislation in connection with various matters relating to natural resources; but, almost invariably, such legislation was employed not for purposes of conserving such resources but rather to facilitate their use by those most interested in their exploitation.

A few restrictive measures did appear relatively early in some of the more settled colonies. For example, in 1682 William Penn contrived a law in Pennsylvania requiring that one acre of timber be reserved for every five acres cut. By the time of the Revolutionary War a number of the colonies had passed restrictions regulating the taking of wildlife, but these seem mostly to have been devised to restrict hunting for the market and to control abuses. In 1837 the Commonwealth of Massachusetts, alarmed at the rapid disappearance of timber, ordered a forest survey. The settlers were too busy pushing back the frontier to give serious thought to matters of resource conservation. The time was not yet ripe. The facts were not yet evident. No informed leadership had yet arisen to acquaint the people with the facts and to interpret their significance.

By the end of the Civil War a few prominent intellectuals, among them such men as Franklin B. Hough, Rossiter W. Raymond, Carl Schurz, William H. Brewer, and Charles S. Sargent, had come to see clearly the possible consequences of exploitation, particularly of timber. They began to call attention to the problem and to suggest possible remedies. By 1870 the stage was set for a national awakening, and events moved rapidly after that. By that time several states had taken a hard look at the declining forests and had passed legislation to encourage planting of trees. Proposals for national legislation began to reach the federal Congress. In 1872, the first Arbor Day was declared by the governor of Nebraska, J. Sterling Morton, and subsequently came to be observed by most of the states. The Timber Culture Act of Congress, designed to encourage tree planting, was passed in 1873.

The federal census of 1870 collected certain basic information relative to natural resources. The botanists made some display of these data at the Philadelphia Exposition of 1876. The American Nursery Association estimated the total forest area of the United States to be 380 million acres; Bernhard E. Fernow estimated the amount of timbered acres used annually and predicted that the timber would be gone in less than a hundred years. He began to talk and write about "forest management" and argued that a forest could be a profitable investment after seventy or eighty years.

In 1873, F. B. Hough, a physician and naturalist who had assisted with the federal census of 1870, presented a paper entitled "The Duty of Governments in the Preservation of Forests" before the annual meeting of the American Association for the Advancement of Science. Impressed, the Association provided for a committee to inform Congress and the state legislatures of "the importance of promoting the cultivation of timber and the preservation of forests." Subsequently, the committee report, presented to President U. S. Grant, called for a national commission to investigate the forestry situation. The result was that Hough was appointed in 1876 to undertake an investigation. Largely as a result of his reports, his agency was made a Division of Forestry in the Department of Agriculture in 1881. In 1886, B. E. Fernow, a European-trained forester, became Chief of the Division. Gifford Pinchot, also a European-trained forester, became chief in 1898, and in two year, by appointing leading scientists as collaborators, built up the staff to include more than one hundred persons. In 1901 the Division became the Bureau of Forestry. With Theodore Roosevelt, a conservation enthusiast, in the presidential chair, forest conservation was on its way with the federal government taking the lead.

The rapidly growing interest in forest conservation also manifested itself in legislation affecting the use of forest resources. Presidents Benjamin Harrison and Grover Cleveland set aside 54 million acres of virgin forests as "forest reserves" under Congressional Acts of 1891 and 1897. In 1907 these reserves were made "national forests," thus implying that they were to be used rather than merely "locked up." Later legislation provided for their extension.

Although legislation providing for the protection and improvement of the national forests came as early as 1897, and in 1905 the administrative function was placed in the Department of Agriculture, it was nearly twenty years before further legislation enabled the federal government to purchase land for timber production and to extend assistance to farmers to improve their farm woodlots. Laws of 1928 made possible a comprehensive program of forest research for the Department of Agriculture.

The extension of the conservation movement to soils and to wildlife came more slowly. The purpose of early land settlement was primarily family support, with little emphasis upon production for a market, and the usual homestead was adequate for that, even though farmers generally not only knew nothing of soil science, but were likely to be poor judges of land in the new environment. It was not until the middle of the nineteenth century, when the

mechanical revolution brought to the farmers the means of large-scale production for market and the rise of industrial cities provided the market for the products of the farm, that farmers began to feel the need of collective action that later brought into being the national farm organizations, the first of which was the Grange.

But even with the rise of national farmers' movements after the Civil War soil conservation came in for scant attention. Interest was centered upon the problems of marketing, credit, the railroads, and other "middlemen," with a strong undercurrent of interest in practical education for farmers. There was no soil science worthy of the name, however, and agricultural technology centered almost entirely upon problems of production in terms of better plants and animals. It was not until the arrival of the twentieth century that soil science began to make genuine headway, and it was another twenty-five years before the country was fully awakened to the menace of soil destruction.

The negative measures regarding wildlife, such as restrictions on take, that had appeared in the colonies before the Revolution, gradually expanded as wildlife became scarcer. Such measures were apparently of little avail except to postpone the day of extinction, and the people seemed to be resigned to the imminence of that event. It was not until after 1900 that positive measures began to appear—measures that if put into general practice bid fair to have the effect of propagating and increasing the wildlife population, even in the face of moderate hunting practices.

Hence, we may say that although the roots of the conservation movement extend back nearly to Civil War days, and some filaments may be found as far back as colonial days, it is not far wrong to date the beginning of the national movement somewhere in the neighborhood of 1900.

Although the conservation movement in the United States has been chiefly concerned with timber, soils, and wildlife, a few words should be devoted to water conservation, now attracting an increasing amount of attention. Because of the diffuse nature of the water problem, with serious shortage limited until recently to certain sections of the country, no attempt is made here to review, even briefly, the historical events connected with the emerging problem of water conservation. So long as the heavy concentrations of population were few and scattered in areas where supply had not become crucial, so long as traditional agricultural methods and a relatively simple industrial technology were practiced, and so long as the prevailing level of living of the population remained relatively low, water supplies tended to be adequate even in those areas where

irrigation was necessary. But these conditions did not persist, and as time has passed more and more water per capita has been required. Furthermore, during the twenty-year period preceding 1930, numerous ponds, lakes, and swamps were drained, and agricultural methods plus deforestation tended to assist rapid runoff, with the result that less and less of the precipitation remained where it fell. Meanwhile, supplementary irrigation as an agricultural technique has come into being, and the number and variety of uses for water have been greatly increased. The demand for water for industrial uses has been greatly expanded, to say nothing of the increased demand per capita for residential use. And so it has come about in recent years that water shortages have been felt over a wider area and with increasing frequency. This has raised the question of the adequacy of future water supplies in an expanding industrial society with a rising level of living.

As yet, however, there appears to be little by way of an organized movement to deal with the numerous and difficult problems that are emerging with reference to water supplies and their uses. Apparently experts are now of the opinion that the total supply of water is adequate for our needs, provided that there is proper planning for receiving, handling, allocating, and conserving it. But, unlike many commodities, water cannot be dealt with as a single entity. It is linked inseparably with the production, manufacture, and use of numerous other commodities, and enters into most conservation problems, notably those of forestry, soils, range management, and wildlife. It is becoming clear that more of the total precipitation must be retained where it falls. The problems arising out of the establishment of priorities, the equitable allocation of water supplies among the various competing demands, and the establishment of regulations regarding its use and re-use are as yet far from being resolved.

Everywhere there exists the need for more and better research to provide the basic facts essential to the formulation of sound and equitable policies for the use and conservation of water. The elementary facts about water resources in the United States are still very incompletely understood. In most situations where problems of water conservation are involved, such questions as how much water is or can be made available, how much water is being used, and how much will be needed, cannot as yet be satisfactorily answered. Also, the various agencies concerned with water management tend to have different objectives, to operate under different laws, and to function within different administrative frameworks. Apparently sound policies based upon fact-finding will need to be

developed locally first and gradually co-ordinated with the appropriate basin programs. Out of these, regional and national policies may eventually be evolved.

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# 3

## CONSERVATION EDUCATION IN THE UNITED STATES

### *What Is Conservation Education?*

We have seen that, in its broadest connotations, conservation represents a way of life involving a personal and social philosophy and a set of attitudes toward nature, life, and society. If we accept this view of conservation, it becomes clear that conservation education consists of more than merely imparting a select body of information or a certain set of specific skills; it must be regarded not only as vocational education, in the sense that it prepares the learner for a specific job, but as preparation for a conservation-oriented way of living, resulting in the development of habits and attitudes and a point of view toward nature, life, and society.

The way of life implied by conservation is not the traditional way of much of the human race. Conservation education seeks to instill a new attitude, less carefree and thoughtless so far as man's relation to nature is concerned. Its aim is to teach man that by understanding and co-operating with nature he can in the long run accomplish more for his own welfare than by blindly fighting to subdue, harness, and change natural forces.

In order to be workable, conservation must become an integral part of the acquired personality pattern, a characteristic of the fundamental culture. Conservation education must be a lifelong process, varying with the needs of the time and of the individual. "Like religion, conservation education must start early; and also like religion, it must start in the heart and mind."<sup>1</sup> To be reared in a

<sup>1</sup> Annette L. Flugger, *The Role of Conservation in the Educational Program of Latin America* (Washington, D. C.: The Pan American Union, 1951), pp. 17-18.

family that practices conservation, to grow up through a school system that offers conservation well taught to all students, and to receive a scientific and liberal education in a college or university that stresses conservation as a social policy is to become a citizen who is likely to be a conservationist for the balance of his life.

The above discussion implies that conservation education does not rely wholly upon a specific body of subject matter but also integrates conservation philosophy with whatever subject matter is at hand. Such is indeed the case. Specifically, conservation deals with man's relationship to the resources of nature, and his efforts to utilize that relationship for his own welfare. It deals with soil, water, vegetation such as forests and grasses, wildlife, fishes, and other products of nature which, in the course of centuries, man has found useful to him in his struggle for survival and the development of a civilization. It deals with the interrelations of these resources, how they have developed, how they are maintained, and how they both support and destroy one another in that complicated system of checks and balances called the "web of life."

Conservation education also deals with the habits and attitudes of men—how men at various times and in various places have reacted to their natural environment and the resources there available; their habits of producing and consuming; their ways of taking forethought for the future; and their motives, philosophies, and values. It deals with the nature of their social organization, especially the economic and governmental aspects, with their relations with their neighbors, and with their disposition to warfare, for in modern times armed conflict is the worst possible enemy of conservation.

Although conservation is not a science *per se*, it is based upon science and technology, in the broad sense, as well as upon philosophy. As philosophy and science provide the goals and the principles, technology (both physical and social) provides the mechanisms by which the desired conservation objectives are achieved. Too often conservation education has been regarded as merely a set of principles and skilled techniques, derived exclusively from the natural sciences, with which the specialist works at the task of conserving resources. Such a view is too limited in scope and tends to hamper the development of conservation education. Without discounting the great contributions to conservation made by the biological sciences in particular and by the natural sciences in general, it should be emphasized that conservation educators must make a broader approach if they are to achieve the goal of a conservation-oriented society. If we accept the definition of conservation education given in these pages, it is clear that the principles and tech-



nologies of both the natural and the social sciences are essential to its development.

As has been implied, conservation education employs both direct and indirect approaches. The time and place to teach a conservation lesson is when and where a logical opportunity presents itself. This may be in the classroom, in the laboratory, or in the field. In the lower grades with younger children the indirect approach will usually be employed; but, as students become more mature, a more direct approach becomes pedagogically feasible until at the college level formal courses in conservation are the rule, though courses in which conservation material is integrated with other subject matter are certainly not excluded.

In summary, we may say that conservation education consists of an attempt to keep before the people the fact that our natural resources represent a priceless heritage without which our civilization as we know it could neither expand nor survive; that these resources are not unlimited; and that the use of each must be economically planned until a larger supply can be found or a satisfactory substitute be either discovered or fabricated.

### *Rise of Conservation Education in American Colleges and Universities*

The history of conservation education in the United States has not yet been written. When that is done, there can be little doubt that the roots of conservation education, and indeed the roots of the entire conservation movement, will be traced to the concern over the wasteful exploitation of American resources and to the examples of practical conservation that had already developed in several European countries. This country was settled chiefly by the working classes of western Europe—people who were accustomed to toil and to economy of consumption. They were also bent upon a life on the land where the stability of ownership and the productivity of virgin soil might bring the good life of which they dreamed. And if while this goal was being achieved the scientific and mechanical revolution burst upon them, so hastening the exploitation of resources as to build cities, create millionaires, and threaten the exhaustion of some of the very resources that sustained them, their behavior is understandable; and they may be forgiven by their descendants who have inherited the results of their lapse of frugality. They were only yielding to the normal urge that possesses those who, when confronted by an unexpected abundance, become wasteful and destructive from the sheer joy of consuming without limit.

The United States was predominantly agricultural until after the Civil War, when the growth of cities got under way. As the farm population came to be more and more at a disadvantage in the face of the growing industrialism and the declining fertility of the soil in the older settled areas, it seems reasonable that the farmers should have petitioned their government to provide some educational assistance for agriculture. The result of their petitions was the creation of the land-grant college system by the Morrill Act of 1862, a system of colleges and universities that has been in the forefront of the movement for conservation education since its inception. Through a period of more than half a century, land-grant colleges of agriculture have succeeded in supplying the farm population of their respective states with scientific information and practices calculated to assist them in farming more economically and in utilizing their resources more effectively. The federal government has shared in this effort, and, if the results to date have not been all that could be desired, the partial failure must be charged mostly to the slow development of the necessary scientific knowledge and the magnitude of the task.

Conservation education in the United States had its beginnings toward the end of the last century. It arose as one phase of the growing conservation movement, particularly in the field of forest conservation and management. Because of the spectacular nature of forest destruction then going on, public interest tended to center upon that problem and to support public effort to ameliorate the condition. It was natural that those colleges and universities that were somewhat less interested in the classical approach to education than in trying to deal with the practical problems of the day should participate in the training of the necessary personnel. It is significant that the leaders of the budding conservation movement—persons who were speaking, writing, and exerting organizational effort to promote conservation—were often the same persons who were giving lectures and conducting investigational work in the interests of conservation in the colleges and universities.

It is not clear just where or when the first educational work in conservation was offered at the college level. Whether or not the botanists and horticulturists were the first formally to offer such work, they apparently laid a good foundation for it in a number of institutions. Such outstanding educators as V. M. Spalding at the University of Michigan, W. J. Beal at Michigan State College, S. B. Green at the University of Minnesota, C. E. Bessey at the University of Nebraska, H. H. McAfee at Iowa State College, and A. N. Prentiss at Cornell University were known to have incorporated some forestry instruc-

tion in their botanical, horticultural, and agricultural courses. Perhaps it was during the decade of the 1870's that the first formal instruction in what might be labeled conservation was offered. William H. Brewer, professor of agriculture at Yale, is said to have given lectures in forestry in 1873 and is known to have been teaching a course in forestry in 1878. It is said that A. N. Prentiss taught forestry to his classes at Cornell University in 1874; that Franklin B. Hough delivered a series of lectures on forestry at the Lowell Institute of Harvard University during the academic year 1874-75; and that T. J. Rothrock lectured on forestry at the University of Pennsylvania in 1877. Also, V. M. Spalding gave a course in forestry at the University of Michigan in 1882. A first course in forestry was offered by B. E. Fernow at the Massachusetts Agricultural College in 1887. By 1897 at least twenty-two land-grant colleges of agriculture were giving some instruction in forestry, according to Graves and Guise.<sup>2</sup> These included the land-grant colleges and universities of Alabama, Arkansas, Connecticut, Idaho, Iowa, Kansas, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, North Dakota, Ohio, Pennsylvania, Rhode Island, South Dakota, Texas, Vermont, Washington, and West Virginia. Other schools touched upon the subject in such courses as botany and horticulture. Following 1900 many colleges outside the land-grant group introduced forestry instruction into their curricula.

The first collegiate course for the training of foresters in North America was established at Cornell University in 1898.<sup>3</sup> (The forestry school at Biltmore Estate, Asheville, North Carolina, had no formal opening date but issued its first catalogue in 1898. However, the school was not of collegiate grade.) The Cornell school consisted of a four-year course staffed by trained foresters headed by B. E. Fernow, who had been chief of the Division of Forestry in the U.S. Department of Agriculture for twelve years. The school closed at the end of five years, having had seventeen graduates. In 1910, L. H. Bailey, dean of the Cornell College of Agriculture, organized a department of forestry that provided professional training until 1936. Since that time only farm forestry has been emphasized as a part of the offerings of the Department of Conservation.

In the fall of 1900, Yale University opened a two-year graduate course in forestry leading to the degree of Master of Forestry. It was initiated by Gifford Pinchot and Henry S. Graves, both Euro-

<sup>2</sup> *Forest Education* (New Haven: Yale University Press, 1932), p. 11.

<sup>3</sup> Ralph S. Hosmer, "Education in Professional Forestry," *Fifty Years of Forestry in the U.S.A.*, Robert K. Winters, ed. (Washington, D.C., Society of American Foresters, 1950), p. 301.

pean-trained in forestry. The Pinchot family endowed the course. Graves was made director and Gifford Pinchot a lecturer. Two other members of the teaching staff were W. H. Brewer and the distinguished botanist, James W. Toumey. The establishment of this school was highly significant because it aimed to produce broadly trained forestry graduates rather than mere forest technicians. Pinchot and Graves believed that the conservation movement was much in need of trained foresters who possessed qualities of leadership. By establishing the school at Yale, they hoped to attract capable liberal arts and science graduates who would be willing to prepare for professional work in the field of forestry.<sup>4</sup> It was a worthy effort and apparently was well rewarded.

The University of Michigan opened an undergraduate department of forestry in 1902. From 1903 to 1923 it was headed by one of the pioneers in American forestry, Filbert Roth. A former student under Professor Spalding at Michigan, Roth had acquired broad experience in forestry by working with Fernow in the U.S. Department of Agriculture, teaching at Cornell, and serving as the first forester in charge of the federal forest reserves. In 1927 the department was reorganized as the School of Forestry and Conservation under the leadership of Samuel T. Dana.

Between 1903 and 1914, a total of twenty-one schools of forestry were started. Of these, twelve (Michigan State College, Iowa State College, University of Minnesota, University of Maine, Pennsylvania State College, Harvard University, University of Nebraska, University of Georgia, University of Washington, Washington State College, University of Idaho, and Colorado College) were opened before 1910.<sup>5</sup> Not all these schools are still in existence, and of those that have survived some have been reorganized one or more times. In 1950 Hosmer compiled a list of forty-two schools that had offered full instruction in professional forestry during the period 1898 to 1948. Eight of these were no longer in existence. Of the thirty-four schools still functioning, three (Duke, Harvard, and Yale Universities) were graduate schools, and thirty-one were undergraduate schools. Of these undergraduate schools, twenty were "accredited" by the Society of American Foresters, five were "listed," and six were "nonlisted" by that Society.<sup>6</sup>

In his study of the land-grant colleges and universities, Arthur J. Klein had this to say:

<sup>4</sup> Hosmer, *op. cit.*, p. 304.

<sup>5</sup> R. K. Winters (ed), *Fifty Years of Forestry in the U.S.A.* (Washington, D.C.: Society of American Foresters, 1950), Appendix II.

<sup>6</sup> *Ibid.*

Forestry is one of the major lines of emphasis in many land-grant colleges, 20 reporting an average of 13 courses in forestry with a total of 29.2 credit hours and 501.6 student credit hours enrollment. The comparatively large number of courses is due to the fact that all phases of forestry are included. The average student credit hours enrollment in the 20 institutions is larger than in any of the other subject matter groups with the exception of agronomy and agricultural economics. Not only are there many enrollments in professional forestry and a considerable number of graduates in forestry from the land-grant colleges each year, but forestry courses are required as service courses in connection with farm forestry and range management. With the increasing emphasis upon reforestation, replanting of denuded areas, the planting of waste lands with forest trees, forest grazing, prevention of soil erosion, flood control, and protection of growing forests, the interest in forestry is likely to continue.<sup>7</sup>

For the period 1902-28, Klein found the enrollments of students of forestry in the land-grant institutions to be as follows:

1902-3	66	1915-16	374
1903-4	26	1916-17†	347
1904-5	45	1917-18	152
1905-6	61	1918-19†	—
1906-7*	114	1919-20	452
1907-8	131	1920-21	391
1908-9	198	1921-22	629
1909-10	352	1922-23	588
1910-11	393	1923-24	834
1911-12	487	1924-25	1003
1912-13	534	1925-26	1074
1913-14	485	1926-27	1011
1914-15	436	1927-28	1076

\* Financial panic.

† War and Reserve Officers Training Corps.

‡ Dependable data for this year not available.

Enrollments in forestry in the land-grant colleges and universities were first reported with accuracy in 1902-1903. The trend was steadily upward until 1913-14. The decline that then set in was especially marked during the first year of the war. With the close of the war forestry enrollment again increased and in 1927-28 there were 1,076 students enrolled in the professional forestry curricula of the land grant colleges. In addition, many agricultural students were taking such courses as farm forestry, general forestry, and range management as electives.<sup>8</sup>

Hosmer has further determined that during the period from June, 1900, to June 30, 1947, a total of 15,662 degrees in forestry were granted by the 42 schools. Of these, 13,054 were undergraduate degrees; 2,460 were master's degrees, and 148 were doc-

<sup>7</sup> Arthur J. Klein, *Survey of Land Grant Colleges and Universities* (Washington, D.C.: Government Printing Office, 1930), vol. 1, p. 762.

<sup>8</sup> *Ibid.*, p. 779.

torate degrees.<sup>9</sup> Thus, during a period of 50 years the profession of forester became established in the United States with a considerable number of graduates actively practicing their profession and with training facilities available for maintaining or even increasing that number. The colleges and universities that have participated in this move to prepare a skilled personnel who might be entrusted with the welfare of our forests deserve a full measure of public recognition for the part they have played in hastening forest conservation in the United States.

The rise of soil conservation and its establishment as an integral part of the educational offerings of American colleges and universities followed a pattern similar in certain respects to that of forestry, though at a somewhat later date. Perhaps some of the factors that help to explain this later development are:

1. The rapid destruction of the forest resources by man constituted an event that tended to stir the imagination of the people more than the less spectacular processes of soil erosion and of fertility decline. Also, the notion of the exhaustibility of the soil had as yet scarcely caught on with the farm population generally.

2. Soil science was still in its elementary stages, even in Europe, where forest management was already well developed. European-trained foresters assumed positions of leadership in that field and education in forest conservation went forward more rapidly than otherwise might have been the case; but no such trained leadership was forthcoming in the field of soil conservation until a later date. The first experimental work in soils in American colleges appears to have been carried on chiefly by men trained in botany, geology, and other allied specialties.

3. Early farmer demand for assistance with their agricultural problems appears not to have been oriented specifically to soils. The land-grant colleges of agriculture were established for the specific purpose of serving the farm population, yet there was at the time little by way of an organized body of agricultural science, and few college professors were trained for teaching in that field. For approximately twenty-five years after the establishment of these colleges, the teachers of general science attempted to fill the gap. Farmers were dissatisfied, however, and demanded that the colleges offer courses in practical agriculture. As a result the agricultural experiment stations were created in 1887 as a part of the land-grant college system for the purpose of developing a workable agricultural science. Even then, and for some time thereafter, the emphasis was placed chiefly upon the conditions necessary for plant growth and

<sup>9</sup> Winters, *op. cit.*, Appendix III.

development. The soil factor was approached from the point of view of soil type and soil physics. The need for conservation as a focus of interest was not yet apparent, although in their teaching the colleges stressed productive efficiency, an approach that in due time would inevitably lead them into the problems of soil conservation.

In the developments that followed, some institutions were in the forefront with capable investigators and teachers. In the West, where the growth of the cattle-raising industry with its accompanying overgrazing of the ranges had focused attention on soil erosion, the Arizona, Nevada, and Washington agricultural experiment stations began work on the problems of range erosion and range management as early as 1900, chiefly at the request of the stockmen. In 1903, President Roosevelt appointed a Commission on Public Lands to consider the problems of land management on the western cattle ranges. The Commission subsequently recommended government control, and by 1904 the National Livestock Association had committed itself to such control.<sup>10</sup>

Other early work done by agricultural experiment stations included that of F. H. King at the University of Wisconsin, where he began experiments on soil nitrification and irrigation as early as 1898.<sup>11</sup> A department of soils was organized in 1906 and soil surveys and soil testing were begun in 1908. At the University of Missouri, after pioneer work had been done by H. J. Waters, F. B. Mumford, and G. M. Tucker, a department of agronomy was created in 1904 with M. F. Miller as head. In 1905 the state appropriated money for a state soil survey and C. F. Marbut, then professor of geology, co-operated with Miller to start the survey and establish experimental fields on different types of soil. Between 1904 and 1915 ten bulletins and two circulars were published, and Miller taught the results of his work not only to students on the campus but also to the farmers through the farmers' institutes common at that time. In 1914 the department was divided into a department of soils and a department of field crops. Miller continued to head the former of these new departments and with H. H. Krusekopf set up a well-known pioneer series of experiments in rainfall loss and soil erosion under various systems of management.<sup>12</sup> An erosion map of the state of Missouri was published in 1935.

<sup>10</sup> L. A. Stoddart, "Range Management," in Winters, *op. cit.*, p. 118.

<sup>11</sup> W. H. Glover, *Farm and College* (Madison: University of Wisconsin Press, 1952).

<sup>12</sup> F. B. Mumford, "History of the Missouri College of Agriculture," *Mo. Agri. Expt. Station Bull.* 483 (1944); A. A. Jeffrey, "Dean Miller's Second Mile," *Missouri Alumnus*, 43, No. 5, (January, 1955), p. 11 f.

Yet enthusiasm for soil conservation work developed slowly. There were skeptics at the academic level, and farmers were not yet insistent in their demands. The proceedings of the annual meeting of the Association of Land-Grant Colleges and Universities reveal little concern about land conservation before the decade of the 1920's. At the meeting in 1909, L. G. Carpenter of Colorado read a paper in which he took a dim view of what he called the "calamity howlers." He thought that, as far as natural resources were concerned, the future looked rosy enough. He contended that waste is inevitable in handling resources, though it is not always economical. He objected to any move to ease the pressure on resources and contended that conservation should not be interpreted as nonuse, but highest use.

No further papers on conservation appear in these proceedings for many years thereafter. It is worth noting, however, that the 1917 meeting included two papers on the production and conservation of food without reference to soil problems. At the first meeting in 1919, Dr. Eugene Davenport read a paper entitled "Wanted: A National Policy for Agriculture." In it he set down fourteen points, the sixth of which was the establishment of an obligation "not only to maintain but also to increase the fertility of the land." He thought this obligation should be equally binding on landlord and tenant and enforced by public license. However, at the second meeting in 1919, Dr. C. E. Thorne, Director of the Ohio Agricultural Experiment Station, in a paper, "Correlation and Cooperation in Regard to Soil Fertility Investigations," made no mention of soil erosion or conservation, as such.

The man usually given most credit for fanning the smoldering interest in soil conservation into a flame is Dr. H. H. Bennett, long-time chief of the federal Soil Conservation Service. Bennett had spent many years in soil survey work with the U.S. Department of Agriculture and had published a book on the soils and agriculture of the southern states. In 1928 he moved into the Bureau of Plant Industry and for five years worked, wrote, and lectured on problems of soil erosion. He was made chief of the Soil Erosion Service in 1933 and chief of the Soil Conservation Service in 1935. Bennett wrote and lectured tirelessly and with great enthusiasm. His U.S.D.A. Circular No. 33, published in 1928 with W. R. Chapline, represented a notable contribution and was given a wide reading. It was entitled "Soil Erosion, A National Menace," and offered a convincing text with pictures. Chapline, an authority on range conditions and management, devoted his contribution entirely to that subject.



Many other agricultural experiment stations were undertaking investigations relative to soil preservation and management. In 1908, J. G. Mosier published Illinois Agricultural Experiment Station Circular 119 in which he said, "If this destruction of soils is as rapid in the future as it has been in the past, large areas will be abandoned and depopulated in Illinois." In 1909 the U.S. Department of Agriculture brought out Farmers' Bulletin No. 342, in which such topics as soil washing, drifting, and the problem of retaining water in the soil were discussed. In it the writers used data from bulletins previously issued by the experiment stations of Alabama, Mississippi, South Carolina, Tennessee, and Wisconsin. In their Bulletin 3 (1890), the Tennessee station explained how to reclaim washed land.

Other sources were issuing literature valuable for educational purposes. E. W. Hilgard's textbook, *Soils*, published in 1906, considered soil erosion. The Mississippi Geological Survey in Bulletin 8 (1911) called attention to soil erosion and gulying. The U.S.D.A. Yearbook for 1913 contained a discussion of erosion, prevention, reclamation; and *Principles of Soil Management*, published in 1909, dealt with soil erosion. The authors were T. L. Lyon and E. O. Fippin. In 1911 M. H. Gregory published a book under the title, *Checking the Waste: a Study in Conservation*, and J. G. Mosier and A. F. Gustafson published *Soil Physics and Management* in 1917. The literature upon which course work could be developed was accumulating.

One of the most noted of these early books was *The Conservation of the Natural Resources in the United States* by Charles R. Van Hise. Although its theme was resources in general rather than soil in particular, it served for many years as a powerful stimulus to the conservation movement and was widely used in college courses.

Among the most impressive documents of the period were the report of the National Conservation Commission, 1909, and the Addresses and Proceedings of the National Conservation Congress, 1909-12. The first of these dealt, among other things, with devastation of the land, floods, and soil fertility. The latter dealt with soil erosion, soil conservation, and related subjects. Previously, at the Conference of American Governors in 1908, important papers dealing with these subjects had been read. The paper by T. C. Chamberlain, geologist of the University of Chicago, was particularly impressive. Said he, "When our soils are gone, we, too, must go, unless we shall find some way to feed on raw rock or its equivalent. . . . The key to the problem lies in due control of the water which falls on each acre. . . ."

tive states through the Agricultural Extension Service, established for that purpose in 1914. Hence, it is safe to say that the development of conservation education with respect to land, in the land-grant colleges, has been closely correlated with the development of experiment station research in this field. To a lesser degree, the same may be said of education in forestry and wildlife, although experiment station research in these subjects has not been as extensive as research in land, including soils. Furthermore, college education in forestry and wildlife in the land-grant institutions has been concerned primarily with the production of professionally trained personnel, whereas research and education in land has been aimed, primarily, at improving the status of the farm family by increasing their knowledge and modernizing their practices.

As compared with forestry and soil conservation, the conservation of wildlife, with its curricula for the preparation of specialists in wildlife research and management, is a latecomer to the colleges and universities. Early conservation thinking centered primarily upon land and forest resources; and wildlife was by most people regarded in the light of a "fringe" subject. Also, wildlife was viewed chiefly from the standpoint of the sportsman, the taker of game; and although its growing scarcity might be deplorable from a recreational point of view, the subject was given scant consideration at such levels as college teaching and research. It was assumed that wildlife would eventually disappear as civilization advanced, and all that could be done was to restrict the annual kill and put off the day of final disappearance as long as possible. The notion that science might be used to perpetuate desirable species of animals had not yet appeared.

With the birth of the conservation movement during the administration of Theodore Roosevelt, the notion of renewable resources came into being. Wildlife came to be regarded as a renewable resource, and game perpetuation became a "cause" to fight for. Gradually the feeling of public responsibility for these resources took hold, and eventually science came to be recognized as the proper means for the attainment of the conservation goal.

Among the earliest enlightened protagonists of wildlife welfare was the growing group of trained foresters. Working in forest areas, they early grasped something of the ecological relation between forests and wildlife and began to give it a place in their training.<sup>13</sup> The Society of American Foresters, organized in 1900, has also exerted a strong influence upon developments in this field. Since

<sup>13</sup> Warren W. Chase, "Forest Wildlife Management," in Winters, *op. cit.*, pp. 140 f.

With the creation of the CCC camps in 1933 and formation of the Soil Conservation Service in 1935 and the need for an expansion of the work in soil conservation was brought dramatically to the fore. This need was emphasized in 1935-36 by the monumental reports of the National Resources Board, which set forth at length the types of erosion and their extent by states, called for aerial surveys and farm reorganization, and presented the need for a national policy for erosion control. Soil erosion was labeled "a critical problem in American agriculture." "The new frontier has appeared underfoot on the farms now under cultivation," said the "Summary of Conditions." "The fundamental problems of land use now reside in the conservation of soil and water resources and intelligent soil and farm management."

As a result of these and other developments, experimental work in the state agricultural experiment stations was stimulated, textbooks appeared, and courses were offered. By 1929-30 workers at Oklahoma were writing of their experimental work in soil erosion, and in 1934-35 Oregon State College gave "one of the first college courses treating the subject as an entity." By that time agricultural extension circulars dealing with conservation for both adults and 4-H youth were in common use.

The literature on soil conservation developed rapidly. In 1938 the U.S. Department of Agriculture published a *Bibliography on Soil Erosion and Soil and Water Conservation*. It contained brief abstracts of 4,388 pieces of literature from books to circulars, of which a "large majority" were published during the preceding 25 years. A check of the listings showed that a total of 106 items dealing with soil erosion and land conservation in general had been published up to and including the year 1925. The bulk of the literature had appeared after 1930.

It is a well-established principle of organizational procedure in the land-grant colleges of agriculture that the experiment station provides research materials for use in resident teaching and in the extension service. Since substantially the same personnel does both the research work and the resident teaching, it is inconceivable that experimental findings with respect to soil conservation would not be used in the classroom. We can be certain, therefore, that as the early experimental work developed, the fruits of research were integrated into the various courses in agriculture, even though no courses were specifically labeled conservation courses. This would be particularly true of courses in soils, agronomy, farm management, and related subjects. It is also certain that, as sound research findings were produced, they were carried to the farmers of the respec-

the forest areas. By 1928 he was making game surveys in the Middle West and in 1933 published his classic book<sup>14</sup> on game management. During the same year he accepted the chair of game management at the University of Wisconsin, the first in an American college, and later established what was perhaps the first Department of Wildlife Management in an American university. Others quickly followed, and since then there has been a steady growth of such work in the colleges and universities.

Thus, the introduction and development of wildlife research and management in the colleges and universities of the United States came during the depression decade of the 1930's as a special academic field for training specialists. Although the movement was spearheaded largely by one man, its development may be attributed to a number of factors, prominent among which were the low level of game populations, progress in wildlife management in the national forests, wildlife research during the previous decade, research in land use, and the growth and influence of the many state conservation commissions.

Up to this point we have discussed briefly the rise of the conservation movement and the rise of conservation education as exemplified by the increase in special training courses for foresters, soil conservationists, and wildlife specialists. These three developments in conservation education have represented three specific responses by American colleges and universities to a public demand for specialists qualified to function in these particular conservation fields. In each case, public interest created an opportunity for the employment of academically trained conservationists, and the educational institutions responded by developing the training facilities necessary to produce them.

So far, nothing has been said of attempts by colleges to provide conservation education for the rank and file of college students. Conservation education for the collegiate "layman," the college student who never intends to be occupationally involved in the subject, who may know little or nothing about the subject of conservation and care less, is a problem very different from that of the production of conservation specialists to meet public demand. The story of how this sort of conservation education has developed in American colleges and universities and how it has fared has been told only in the most fragmentary manner, and it is not possible to complete the story here. That would represent an excursion into historical research that neither time nor other resources would

<sup>14</sup> *Game Management* (New York: Charles Scribner's Sons, 1933).

1900 an increasing number of organizations have lent their support to wildlife preservation and management. However, there has long been great confusion of thought on the subject of wildlife, and research has lagged. Today, even within the best professional circles, there is much confused thinking concerning the place and significance of wildlife in the modern scheme of things and what should be done to make its place secure.

Before 1900 the U.S. Department of Agriculture's Division of Economic Ornithology and Mammalogy, which was established in 1885, began to make studies of animal life in relation to agriculture. For example, analyses of the stomach contents of birds were made to determine whether they were an asset or a liability to farmers. These studies were gradually expanded to include studies of the life history and distribution of various animals. Thus was laid the foundation for later ecological thinking. During the thirty years following the turn of the century, such happenings as the growing scarcity of "game," the establishment of wildlife refuges, and the notable contrasts between the thriving wildlife populations in the national forests and other refuges as compared to wildlife populations elsewhere not only sharpened interest in the problems of wildlife management, but tended to stimulate research as well.

However, beyond that done by the federal government, comparatively little research on wildlife conservation had been carried on prior to 1930. Of the 113 references dealing with wildlife in relation to soil conservation, a topic of considerable significance, compiled in 1938 by the Soil Conservation Service, only seven were published before 1930. Five of these publications were bulletins of the U.S. Department of Agriculture and appear to have been based upon research. Only one was a publication of a college or university. It was an extension circular by R. H. Westveld and Rudolph Bennitt, published by the University of Missouri. The remainder of the 113 references were published during 1930 or after; most of them were issued during the three years 1935-37. It is clear from this and other evidence that the great upsurge of interest in wildlife conservation came after 1930 and that one of its effects was to stimulate research and teaching in the colleges and universities of the nation.

As in the case of soil conservation, the sudden development of interest in wildlife conservation was stimulated largely by the efforts of one man, Aldo Leopold, a trained forester with the master's degree from the Graduate School of Forestry at Yale University. Stationed in the Southwest, he combined his work in forestry with his early interest in ornithology and studied wildlife as he cruised

TABLE 1  
COLLEGES AND UNIVERSITIES OFFERING SPECIFIED TYPES OF  
CONSERVATION COURSES IN 1938\*

Type of school	Number of Schools	Soils and Land Use	Field Zoology	Field Botany	Conservation of Natural Resources
Percentage of Schools Offering					
Land-grant colleges and universities	53	57	85	62	21
Nonland-grant universities	94	4	43	28	13
Other four-year colleges	272	2	22	17	9
Teachers' colleges	147	5	35	16	45
Junior colleges	85	—	5	2	2
Total	651	7	31	20	18

\* Computed from catalogue data compiled by Charles W. Quaintance, *op. cit.*

in the public schools. To prepare for this sort of teaching, the prospective teacher needs general training and is more likely to take general courses in conservation than specialized ones.

It is worthy of note that relatively few of these colleges and universities, except for the land-grant institutions, offered courses in soils and land use. Except for the teachers' colleges, nonland-grant institutions were most likely to offer courses in field zoology or field botany. Teachers' colleges were most likely to offer courses in general conservation, followed by courses in field zoology. Junior colleges offered little: of the 85 schools whose catalogues were examined, only 5 per cent offered a course in field zoology and 2 per cent a general course in conservation.

The breadth of course offerings as defined by the four types of courses listed in Table 1 is indicated in Table 2. From the table it is seen that, of the 651 institutions studied, 55 per cent offered none of these four types of courses in conservation. One fourth offered one type only, 13 per cent offered two types, and 5 per cent offered 3 types. Only 2 per cent offered all four types.

Table 2 clearly shows the superiority of the land-grant institutions with respect to frequency of course offerings in conservation, according to Quaintance. Only 7 per cent of these institutions were offering no courses in conservation within the scope of the four types considered. By comparison, 45 per cent of the nonland-grant universities, 65 per cent of other four-year colleges, and 35 per cent of the teachers' colleges offered no such course. None of these groups of institutions had as many as one fourth of their

permit. All that can be done here is to review briefly the findings of the three most prominent attempts to assemble knowledge on the subject.

In 1938 Quaintance<sup>15</sup> investigated course offerings in college and university catalogues. He sent out requests to 1,130 institutions and received catalogues from "well over 50 per cent." He then prepared lists of the co-operating institutions by states and for each one indicated the types of conservation courses offered in terms of certain categories. From these course listings by states, it is possible to tabulate his data by type of institution and by general type of course. Table 1 presents the findings of this tabulation. It will be noticed that the educational institutions have been grouped into five types: namely, the land-grant colleges and universities, the nonland-grant universities, teachers' colleges, other four-year colleges, and junior colleges. Included in the listings were eighteen specialized colleges, but since none of them offered any conservation course that fell in the categories under consideration, they were omitted from the table.

The types of courses considered here were courses in soils and land use, field zoology, field botany, and courses, usually in geography, labeled "conservation of natural resources." Presumably the last category represents the general type of course commonly offered to the nonspecialist who desires to become informed about conservation. As to the specific nature of the courses listed by Quaintance in the other three categories, we have his judgment based upon catalogue examination that they actually dealt with conservation and that they are properly classified in the categories given.

It may be seen from a casual examination of Table 1 that of the 651 educational institutions listed, 7 per cent offered one or more courses in soils and land use; 31 per cent, one or more courses in field zoology; 20 per cent, one or more courses in field botany; and 18 per cent, one or more courses dealing with conservation of natural resources.

It is evident from Table 1 that in 1938 the land-grant colleges and universities led the procession of institutions of higher learning in course offerings in the field of conservation. A far higher proportion of these schools offered each of the four types of courses than the average for all schools or for all types of schools, except for one instance: a higher proportion of the teachers' colleges offered one or more general courses in conservation of natural resources. This is to be expected, in view of the emphasis placed upon conservation

<sup>15</sup> Charles W. Quaintance, "Conservation Education in the Schools and Colleges of the United States," unpublished Ph.D. dissertation, Cornell University, 1939.

There are good reasons for anticipating the superiority of the land-grant colleges and universities with respect to the number of conservation courses offered. In the first place, by virtue of their close relationship with the federal government and with the agricultural interests in their states they have been in a position to receive stimulation from these sources in matters relating to the conservation of resources. In the second place, they have as a group gone farther in developing specialized curricula for the training of foresters, agricultural engineers, soil specialists, and specialists in wildlife management than any other class of educational institutions. These specialized curricula require a considerable development of basic physical and biological science to provide the background for specialization. Such a situation provides a perfect environment for the nurture of conservation education. Finally, the land-grant colleges and universities rank among the largest of our schools, and possess the resources to present a large collection of courses bearing upon the subject of conservation.

About the year 1947 Funderburk<sup>16</sup> located, through a perusal of catalogues, 106 colleges and universities at that time offering one or more courses in general conservation. Of these 4 were land-grant colleges and universities, 34 were nonland-grant colleges and universities, and 68 were teachers' colleges. Funderburk was apparently interested chiefly in the work of teachers' colleges. He limited his analysis to the institutional catalogues then available in the collection of the George Peabody College for Teachers where he conducted his investigation. This resulted in an imbalance in favor of teachers' colleges in his sample. Thus, of the schools listed as beginning their teaching of conservation during the decade 1920-30, 83 per cent were teachers' colleges; and, likewise, of those listed as beginning during the decade 1930-40, 62 per cent were teachers' colleges. This is far out of line with the proportion of such institutions in the United States at that time.

Geographically, the institutions investigated by Funderburk were pretty well scattered. However, his list of teachers' colleges was heavily weighted with a few states that possessed a considerable number of such colleges, such as Oklahoma, Pennsylvania, and Wisconsin.

At the time of the study 90 of the institutions, or 85 per cent of those examined, were teaching the work offered in general conservation in the department of geography or the department of geography and/or geology. In a few cases the department name

<sup>16</sup> Robert S. Funderburk, *The History of Conservation Education in the United States* (Nashville: George Peabody College for Teachers, 1945), pp. 55 f.



TABLE 2  
COLLEGES AND UNIVERSITIES OFFERING SPECIFIED TYPES OF  
CONSERVATION COURSES IN 1938\*

Schools Offering Courses	Total Schools	Schools Offering				
		None	1 Type Only	2 Types Only	3 Types Only	All 4 Types
<i>Number</i>						
Land-grant colleges and universities	53	4	10	17	13	9
Nonland-grant colleges	94	42	29	17	4	2
Other 4-year colleges	272	176	64	24	8	0
Teachers' colleges	147	52	53	31	11	0
Junior colleges	85	77	8	0	0	0
Total	651	351	164	89	36	11
<i>Per Cent</i>						
Land-grant colleges and universities	100	7	19	32	25	17
Nonland-grant colleges	100	45	31	18	4	2
Other 4-year colleges	100	65	23	9	3	0
Teachers' colleges	100	35	36	21	8	0
Junior colleges	100	91	9	0	0	0
Total	100	55	25	13	5	2

\* From Charles W. Quaintance, *op. cit.*

number offering two types of courses, and practically none offered all four types of courses. By contrast, 32 per cent of the land-grant group offered two types and 17 per cent offered all four types of courses.

Thus we see that, with the exception noted above the land-grant colleges and universities in 1938 showed not only a far higher proportion offering each type of course considered by Quaintance, but a far greater breadth of course offerings as well.

In evaluating these findings, it must be remembered that the tabulations from the Quaintance study include only four types of courses, or, more precisely, subject-matter areas. Courses in which conservation was taught may have been given in other subject-matter areas but not tabulated. However, the four areas tabulated are clearly among the most likely ones. Also, the tabulations offer no clue to the number of conservation courses offered in any particular subject-matter area, which is obviously a matter of great importance. It is doubtful, however, whether more elaborate tabulations would materially change the over-all position of the various institutional groups.

Clagg limited his project to an intensive on-the-spot study of conservation teaching and related topics in fifteen selected institutions located in the Southeastern states. Twenty-one additional institutions supplied questionnaire information. He tried to determine the content of conservation courses and the extent of conservation offerings in other courses; the extent of co-operation among educational institutions and other conservation agencies; the relation of the work in conservation education to the conservation needs of the area; and the opinions of instructors with regard to the teaching programs and their needs.

The institutions chosen for study were the state universities of the eleven Southeastern states included in the survey, plus four additional schools chosen because of their known offerings in this field, and because each possessed a noted conservation educator.

Conservation education was defined in terms of general education, thereby ruling out conservation education for the training of specialists or of those semispecialists, such as farmers, who need such training for the successful operation of their business. Consequently the courses offered in the professional colleges, such as agriculture and engineering, were not included in the investigation.

As to primary courses in conservation education, 13 of the 15 schools visited taught one or more such courses. Departments of geography offered 71 per cent of these courses, and departments of education 14 per cent. Geographers were teaching 78 per cent of all primary courses, and 57 per cent of them were called "Conservation of Natural Resources." All schools offered these primary courses at the Junior level, and the number of semester credit hours per course was usually three. However, teachers complained that there was not time enough for satisfactory coverage, and student backgrounds were not adequate for understanding the subject.

Some 13 aspects of conservation were taught by the institutions visited but only five (soil, water, forests, minerals, and wildlife) were taught at all 15 of the schools. Some institutions placed special stress upon soils, water, or forests because of their close relation to the needs of the particular area in which the institution was located.

Only two fifths of the courses employed field work as a teaching technique; "all sorts of visual aids were in use but were not used often." Either oral or written reports were required by all instructors; more than three in five required both. A variety of textbooks had been used during the previous five years, but at the time of the interview more than three fifths of the teachers were using *American Resources*, by J. R. Whitaker and E. A. Ackerman. Four fifths of the instructors were satisfied with the text then in use.

was varied by the use of such terms as "physiography" or "earth science" in combination with geography or geology, but they apparently meant substantially the same thing. The other 15 per cent of the schools offered the work in general conservation through eight other departments: natural science or science, biology, botany, economics, social science, education, agriculture, and "conservation series." No one of these departments was used by more than three schools.

Funderburk also obtained the date, or approximate date, at which these institutions offered their first course in general conservation, and grouped them by decades. He found that four schools had offered a course in general conservation during the decade 1910-19. These were the University of Indiana, Harvard University, Ohio University at Athens, and Iowa State Teachers College at Cedar Falls. Twenty-four schools first offered a course during the decade 1920-29; seventy during the decade 1930-39; and eight during 1940 or after. Fifty-three of the schools offered their first course in general conservation during the five-year period 1935-39. The period 1930-39, it will be recalled, was one of rapid development in conservation activity and education, particularly in the fields of soil conservation and wildlife. Apparently the rate of adoption of first courses in conservation education by the colleges slowed greatly after 1940, inasmuch as Funderburk lists only eight institutions as beginning such work during the period 1940-47.

Funderburk believes that most of the general courses in conservation have been introduced to acquaint teachers and prospective teachers with the field of conservation. He concludes that "the preparation of teachers to carry on conservation instruction"<sup>17</sup> has been one phase of conservation education in institutions of higher learning.

Funderburk devotes scant space to that phase of conservation education which prepares specialists to carry on the actual work of conservation. He does, however, list seventeen institutions offering one or more degrees in soil conservation and the same number offering one or more degrees in wildlife conservation. All these were land-grant colleges and universities.

The most recent of the three studies reviewed here is that of Sam E. Clagg<sup>18</sup> of Marshall College, Huntington, West Virginia.

<sup>17</sup> *Ibid.*, p. 62.

<sup>18</sup> The Status of Conservation Education in Selected Institutions of Higher Learning in the Southeastern United States," dissertation for the Doctor of Education degree, University of Kentucky, 1954.

done at the institutions visited was directed toward the professional education of teachers or of prospective teachers.

With this review of previous field studies of conservation education, Part I of this book comes to an end. Part II reports the results of our own investigation of the teaching of conservation in the colleges and universities of the United States.

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The average size of class in these primary courses in conservation was 27 students. Less than 1 per cent of the students enrolled in the 15 institutions studied were annually enrolled in these courses. The courses were nowhere required of all students, but about one third of them were required in certain major areas related to teacher preparation. Three fourths of the students enrolling for these courses appeared to be prospective teachers. The remainder consisted of students majoring in conservation and related subjects.

Most of the conservation teachers felt that the population of their area did not have a clear concept of conservation. They thought of it as "saving something," or as the work of some government agency. The term "resource use" seemed to be more generally understood, but it did not seem to be closely related to the concept "conservation." For these reasons, it was felt that unity of the people in a conservation movement would be difficult to achieve at this time.

Conservation teachers were of the opinion that conservation instruction should be offered at all school levels. Most of them believed that all prospective teachers should have at least one course in the subject. None of them felt that the current teaching of conservation in the schools of their respective states was adequate.

Some conservation was taught in certain courses not considered primarily conservation courses. In these courses, conservation was usually taught incidentally wherever it seemed appropriate. The conservation aspects receiving most emphasis in these integrated courses were soils, water, and forests. The general rule was that the conservation topics most related to the major content and aims of the course were the ones emphasized. More than two fifths of the students enrolling for these integrated courses were prospective teachers.

Using the 1954 *Directory of College Geography in the United States*, Clagg learned of 35 other colleges and universities in the region, in addition to those visited, that were offering courses in conservation education. He obtained questionnaire reports from 21 of these, and found that the results tended to validate the results obtained by interviews at the 15 institutions visited.

In view of the fact that Clagg is a geographer, it is entirely understandable that he should limit his study to conservation as general education, with particular reference to geography. His results would have had a broader appeal, however, had he included all conservation education offered by the institutions under investigation. In these days general education and professional education in conservation are not always so easily separated. Limiting his field as he did, Clagg found that much of the conservation teaching

## PART II

### *The Survey and Its Findings*

The three chapters of Part I gave a brief review of the historical background of conservation in the United States. In Chapter 1, the reader was introduced to certain concepts current in the literature of resource use. Some of these are "resource," "conservation of natural resources," and "conservation education." In Chapter 2, the physical, economic, and social background that set the stage for the rise of the conservation movement was reviewed. Chapter 3 described the rise of the modern conservation movement. While they are admittedly sketchy, it is hoped that these chapters have provided a suitable motivation for Part II, which contains the story, in survey form, of what the colleges and universities of the United States are now doing in the way of teaching sound principles of resource use.

# 4

## METHODS AND PROCEDURES

The problem that confronted the investigators in making a national survey of the teaching of conservation in the colleges and universities of the United States was not simple, undertaken as it was chiefly through the channels of indirect communication. There are some 1,800 colleges and universities in the United States and they vary greatly: universities, liberal arts colleges, teachers' colleges, junior colleges, and technical schools. There are colleges with a few hundred students and others with thousands. Some are co-educational, some are for males only, and some for females only. Some are church-related and some are not. Some are supported by private funds and others by public funds. To make personal visits to any significantly large sample of these diverse institutions would have required more time and financial resources than were available. It was clear that the necessary information would have to be assembled from mailed questionnaires and the study of printed sources. Institutional catalogues alone would not suffice. The catalogues of the larger institutions are likely to be reliable with reference to any given year, but many of the smaller institutions issue comprehensive catalogues only at irregular intervals, if at all. Also, many schools that do issue catalogues do not keep them strictly up to date, so that often courses are listed that have not been actually taught for some years, and some new courses may be taught before they appear in the catalogues.

There are many aspects involved in the teaching of conservation at the college level. There are, of course, policy and administration; the question of facilities in the form of space, equipment, and literature; the number of teachers and their qualifications; the curriculum, its subject matter, and how it is offered. And, also, there is

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attitudes, and opinions supplied by the respondents. However, the authors believe it to be a fairly close approximation.

### *Meaning of the Data*

In spite of the known shortcomings of the mailed survey, it was believed that a sufficient return of questionnaires could not fail to yield recognizable trends, tendencies, and clusterings, based upon one or more characteristics, and this indeed proved to be the case. These results were taken to be valuable chiefly in a comparative rather than in an absolute sense. This is important in the interpretive aspects of the study because it emphasizes a relative yardstick rather than a theoretical standard of judgment. In other words, while it might be possible to say that one type of school had more of one characteristic and less of another as *compared* with another type of school, it could not be said that either type of school should, or should not, possess a given characteristic, according to some external criterion of value. Therefore, throughout the study, this comparative method of presentation has been utilized. An attempt has been made to draw a reliable picture of the situation with a minimum of evaluative technique.

Of course, some selectivity has been exercised with regard to the variables and comparisons deemed meaningful and important. This would be necessary under any methodology. While not all the variables selected yielded notable results, they were often helpful in pointing up inconsistencies and anomalies in the data. In any analysis it is just as necessary to know where the confusions are as it is to illustrate clear-cut distributions. Very often these confusions reflect the real state of mind of the respondent, who may not be at all sure of his position on some of the issues. Wherever discrepancies seemed to occur in significant areas of the research, they are noted and discussed in the text.

In summary, then, the following can be said about the scope and method of the study as a whole. In the first place, it did not attempt to judge teachers and programs in terms of some arbitrary set of criteria as to what constituted a "good" school program, a "good" course, or a "good" teacher. Such evaluations as were made, particularly in terms of the "scores" of schools on certain factors for which information was available, were for the purpose of validating the existence of cluster groups suggested by other facets of the data. Secondly, it did not seek to provide a blueprint for establishing or altering conservation education programs. The diversity of American colleges would rule out any attempt to set up a single "ideal"

the student body, its interests, attitudes, and reactions to the teaching of conservation. This study could not hope to cover adequately all these important aspects, but it could and did assemble what appears to be pertinent information regarding all but the matter of student interest, attitudes, and reactions. It was not feasible to undertake a survey of student opinion.

The data collected by questionnaire and by analysis of catalogues and other submitted literature were supplemented by personal interviews at selected institutions, chiefly for the purpose of checking the accuracy of the answered questionnaires. The questionnaire data were collected during the spring, summer, and fall of 1954. Analysis proceeded throughout the twelve months beginning July 1, 1954. The manuscript was completed during August, 1955, and later was edited for publication.

Since the study was to be national in scope, it was decided to try to reach the largest number of units possible. This approach necessitated a further limitation upon the study: namely, some sacrifice of depth for breadth. Since it was impossible to interview respondents personally, they had to be reached via mailed inquiries and inventories, a procedure which not only results in relatively superficial answers, but introduces some statistical biases.<sup>1</sup> Nevertheless, it was felt that in this initial stage of research broader coverage would yield more "leads" and better perspective, which in turn would increase the value of any later, more specialized studies. Therefore, some precision in the content and handling of data was knowingly sacrificed in favor of a more generalized treatment.

Procedurally, this meant that a considerable variation in the interpretation of questions by the respondents was bound to occur. Actually, there was no way of accurately measuring the nature and extent of such variation, except by limited pretesting of the schedules.<sup>2</sup> Thus, it should be made clear at the outset that not only did the schedules supplying data for the following chapters have to be interpreted by the respondents in the first place, but their answers had to be reinterpreted by the study staff without the benefit of face-to-face communication. To some extent, then, the analysis of the data is an approximation to, rather than a mirror of, the facts,

<sup>1</sup> The use of mailed questionnaires has usually turned up highly selective bodies of data, resulting from the high percentage of "no returns." This tempers the kinds of generalizations that can be made from the data to the "population" (here meaning the entire range of data sources) as a whole. In personal interviewing this "no response" bias can be kept to a minimum by rigorous sampling procedures and persistent follow-up of respondents in the sample.

<sup>2</sup> This was done, as explained later in the chapter.

TABLE 3  
PERCENTAGE OF RETURN FOR SCHOOL QUESTIONNAIRE\*

Type of School	Questionnaires		Per Cent Return
	Sent	Returned	
Four-year colleges and small universities	865	601	69.4
Teachers colleges	164	130	79.2
Junior colleges	468	293	62.6
Total	1497	1024	68.5

\* Although nearly all the computations were carried out on the basis of this 68.5 per cent sample, a follow-up mailing was sent to those schools which did not reply to the first inquiry. The additional returns increased the totals as follows:

Type of School	Total Return	Per Cent Return
Four-year colleges and small universities	737	85.2
Teachers colleges	161	98.1
Junior colleges	375	80.1
Total	1273	85.0

Selected computations with the 85 per cent sample were carried out and compared with results of the 68 per cent sample. In no case was there a result that varied more than 2 per cent from the original findings. The additional responses caused a lowering of the percentage of schools teaching conservation from 55.3 to 54.3 per cent. The internal differentials were probably a reflection of this one shift.

administrative nature of these institutions made it seem likely that the questionnaire could not adequately reflect the diversity of their offerings and activities in conservation education. Furthermore, there was greater probability that no single administrative officer would have enough information at hand to answer all the questions submitted, in which case, the inquiry might either remain unanswered or be so long delayed through referrals to various department heads that it could not be used in the tabulations. Consequently, a separate content analysis<sup>4</sup> was made of the course offerings of these schools to determine the nature and extent of their conservation teaching. These data obtained from institutional catalogues are reported separately in the latter part of Chapter 5.

### THE TEACHERS

Using the administrative questionnaire as a basis, it was possible to compile a roster of persons currently engaged in some form of

<sup>4</sup> The latest available catalogues of these schools (none earlier than 1953) were canvassed according to their majors, degrees, and departments related to conservation.

program. The applicability of the findings of this study must be assessed in the light of the complex of variables found in different sorts of schools, and perhaps in each individual school. Therefore, no attempt has been made to develop a universal formula for conservation education.

On the positive side, it is felt by the authors and sponsors that the study has accomplished the following things:

1. Given an over-all comparative picture of the incidence and scope of conservation education in the colleges and universities of the United States.
2. Provided reliable indications of the knowledge, attitudes, and opinions of teachers of conservation about their subject and its place in education.
3. Examined the content of the courses taught by these teachers, and the manner in which such content is presented to the students.
4. Summarized the criticisms of current programs made by administrators and teachers, and their suggestions of their improvement.

### *Procedures*

#### THE SCHOOLS

Each area of research was part of a sequential pattern. The first area to be considered was that of the schools. To the administrative head of each of the universities, colleges, and junior colleges<sup>3</sup> of the United States was sent a one-page questionnaire (see the Appendix), which furnished some general information about the school, its conservation program, and some judgment by the respondent as to the adequacy of plant and teaching facilities available. It was, in a sense, a preliminary inquiry designed to separate those institutions apparently doing something in conservation education from those doing nothing. These two major groups were then compared on the basis of several characteristics such as type of school, enrollment, source of funds, location, and the like. The main purpose of this series of comparisons was to find differences between teaching and nonteaching schools that might show definite trends or clusterings based upon the variables mentioned above. A discussion of these findings is included in Chapter 5.

Table 3 indicates the coverage obtained with the administrative questionnaire.

It should be pointed out that this questionnaire was not sent to schools with enrollments of 7,000 students or over, or to land-grant colleges and universities, regardless of enrollment. The complex

<sup>3</sup> The lists used for mailing purposes were furnished by the *World Almanac* (New York: *New York World-Telegram and Sun*, 1954).

The first half of Table 4 indicates that approximately the same proportion of teachers from each type of school answered the questionnaire. Thus it may be assumed that the sample used in the computations reported in Chapter 6 is basically representative of the population of conservation teachers, in this respect at least.

The second half of Table 4 indicates the kind of institutional coverage provided by the second questionnaire. The differences in coverage were mainly the result of reaching more teachers in certain types of schools. This statement is borne out by the fact that the ratio of instructors to schools heard from, shown in Table 5, was a good indicator of school coverage.

It is understandable from the data of Table 5 that institutional coverage in the Land-Grant and Large Universities category, with an average of more than five questionnaires per school, would be

TABLE 5  
RATIO OF TEACHERS TO SCHOOLS, BY TYPE OF SCHOOL

Type of School	Teacher-School Ratio	
	Contacted	Received
Land-grant and large universities	5.1	2.7
Four-year colleges and small universities	1.9	1.4
Teachers' colleges	2.2	1.3
Junior colleges	1.8	1.3
Specialized schools	2.2	1.5
Total	2.4	1.6

greater than in the other types of school. In spite of these variations, however, it is believed that the school coverage in all categories was sufficient to reflect general teacher opinions based upon type of school. In fact, only 7 per cent of all the schools found to be teaching some aspects of conservation did not name at least one person to whom a teacher questionnaire was sent.

### THE CURRICULA

As a part of the teacher questionnaire, respondents were given the opportunity to specify and describe the content and methods of teaching employed in their own courses dealing with conservation (see the Appendix). Only about 11 per cent of the teachers failed to provide this information. Distribution of course returns is given in Table 6.

Table 6 indicates that the preponderance of the Land-Grant and Large Universities category in the course analysis data continued

conservation teaching. Names of teachers were often listed in response to Question 17 of the school questionnaire. If a school was said to be teaching conservation, but listed no names, the individual answering the schedule was asked to supply them. In addition to these lists, names were secured from a content analysis of the catalogues of the land-grant institutions and large universities, and were also requested from heads of departments whenever course descriptions did not designate an instructor. Thus, the range of possible respondents for a second questionnaire was extended beyond the limits of the first, and thereby provided for a broader set of comparisons.

When a master list of teachers had been compiled, the teacher schedule (see the Appendix) was sent to all individuals. Coverage obtained with this schedule is indicated in Table 4.

TABLE 4  
PAGE OF RETURN FOR TEACHER QUESTIONNAIRE\*

Type of School	Questionnaires			Schools		
	Sent	Returned	Per Cent Return	Con- tacted	Returned	Per Cent Return
Land-grant and large universities	420	184	43.7	82	69	84.1
Four-year colleges and small universities	496	220	44.2	261	161	61.6
Teachers' colleges	248	101	40.5	111	80	72.0
Junior colleges	231	101	43.5	132	78	59.0
Special schools	42	20	47.6	19	13	68.0
Total	1437	626	43.5	605	401	66.2

\* As in the first questionnaire, a check was made on the sample used, by checking results using a larger sample. Nearly one hundred questionnaires were received after the initial processing deadline was reached. This increased the total returns as follows:

Type of School	Total Return	Per Cent Return	Per Cent School Coverage
Land-grant and large universities	221	52.6	90.0
Four-year colleges and small universities	247	49.7	64.3
Teachers' colleges	121	48.7	80.0
Junior colleges	115	49.7	62.8
Specialized schools	21	50.0	68.0
Total	725	50.4	70.7

Sample computations involving the above returns were carried out on several of the questions. Resulting differentials were rarely more than 1.5 per cent—a variation even smaller than that experienced in the school questionnaire. It was therefore assumed that the 43.5 per cent sample of teachers was sufficiently representative of the teacher population to warrant its use for this report.

sampling criteria necessary for a precise statistical analysis of the data could not be met because of the breadth and the exploratory nature of the study, no definitive results were expected or obtained. Rather, certain tendencies of an internally comparative type, based upon selected variables, were found to exist. These tendencies should be thought of as directional indicators rather than measurements of intensity.

The use of the mailed questionnaire as the source of data for the substantive comparisons is acknowledged to have its deficiencies; yet it had certain advantages of coverage and economy that dictated its use in this particular research project. Furthermore, the unusually high return on both questionnaires did offset to some extent the selectivity bias, frequently a major drawback of this method of collection. Each of the three basic areas of investigation—schools, teachers, curricula—was processed in a similar fashion, through a system of coding, card-punching, tabulation, and the computation of a series of percentages and indexes. The comparisons in the following chapters are generally presented in percentage terms, so that relationships can be adduced in the simplest fashion.

TABLE 6

RATIO OF COURSES TO TEACHERS AND SCHOOLS, BY TYPE OF SCHOOL

Type of School	Number of Courses	Number of Teachers	Course-Teacher Ratio	Number of Schools	Course-School Ratio
Land-grant and large universities	343	184	1.9	69	5.0
Four-year colleges and small universities	288	220	1.3	161	1.8
Teachers' colleges	150	101	1.5	80	1.9
Junior colleges	138	101	1.4	78	1.8
Specialized schools	42	20	2.1	13	3.2
Total	961	626	1.5	401	2.3

the trend established in Table 4. Not only were there more teachers of conservation in this category, but on the whole they taught more courses per individual than did teachers in the other school types (except Specialized Schools). The ratio of courses to schools brings out these differences even more. The main point to be made here is that the representation of the Land-Grant and Large Universities group in the course analysis data discussed in Chapter 7 was far greater than that found in either the school or the teacher analysis. Because of the nature of the case, this situation did not reflect an unanticipated bias, as far as comparisons were concerned, but it did drastically change the distribution of certain variables, such as Source of Funds, Church Affiliation, etc., applied to the three major sets of data in the study.

Nevertheless, despite the increased quantitative weight that was given the Land-Grant and Large Universities category in the curricular analysis, the generally close correspondence of the Teacher-School Ratio (received) in Table 5 and the Course-Teacher Ratio in Table 6 indicates that the distribution of courses by type of school in the sample data constituted a reliable reflection of the actual distribution of courses in the whole population of conservation teachers.<sup>5</sup>

From what has been said in the preceding sections of this chapter, the method of the study should now be clear. Since many of the

<sup>5</sup> Continuing the kind of reliability check made in the previous sets of sample data, the curricular analysis was expanded to include courses contributed by the 50.4 per cent sample, as compared with the 43.5 per cent sample. The total courses in the larger sample numbered 1,092. All-School distribution on all variables yielded no shifts greater than 2 per cent, and in most instances, percentages were altered less than 1 per cent. It is thus believed that the 43.5 per cent sample represents a picture of the population as reliable as that of the 50.4 per cent sample.



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conservation, is likely to be added to or dropped from the curriculum. But whether they are fully informed or not regarding the educational offerings of the school, it is important to know what they *think* the institution is doing about such a subject as conservation and to obtain their evaluative judgments regarding it; hence the questionnaire to the presidents or other appropriate administrative officials of the colleges and universities surveyed.

The administrative questionnaire referred to in Chapter 4, and presented as a part of the Appendix, was sent to the administrative head of each university, college, and junior college located in the continental United States, except for (1) all land-grant colleges and universities regardless of size, and (2) all other colleges and universities with enrollments of 7,000 or more students, for reasons already explained. The letter accompanying the inquiry specifically requested the administrative officer to answer the questionnaire himself. This request was made to avoid unnecessary delay that might result from referral to one or more department heads or other teachers.

However, the returns showed that the chief administrative officer did not always reply as requested. A check of the returns revealed that in nearly 35 per cent of the cases the president did answer: a figure that varied from 30 per cent for the Four-year Colleges and Small Universities\* to 48 per cent for the Special Schools. In nearly 25 per cent of the cases, the information requested was supplied by other administrative officers. These included vice-president, registrar, and assistant or secretary to the president. Thus, in about 75 per cent of the cases, an administrative officer above department heads supplied the requested information. In nearly 20 per cent of the cases, someone below that administrative level, usually a department head or teacher, supplied the information. The extent to which department heads and teachers were involved varied greatly with the type of school. In the Special Schools, only 7 per cent of the respondents belonged to these academic categories (as contrasted with strictly administrative categories), but in the Teachers' Colleges 39 per cent of the respondents were so classified. Other types of schools varied between these two extremes.

Even though such referrals were frequently made, there can be little doubt that the questionnaire reflected the administrative point of view. There is evidence to support the view that college and university administrators were interested in the investigation and were not disposed to treat it lightly. Hence, it may be assumed

\* A "small university" by definition in this study is one having an enrollment of less than 7,000 students.

# 5

## CONSERVATION TEACHING: AN ADMINISTRATIVE PICTURE

In this chapter attention is focused on the comparison of certain characteristics of the 1,116 colleges and universities for which data were assembled. The figure represents approximately 60 per cent of all the colleges and universities in the United States. It does not include all those for which data were obtained, because some replied too late to be included in the tabulations. However, there is little basis for supposing that the proportion indicated herein gives anything but a reasonably reliable and representative picture.

The chapter is devoted to an analysis of the characteristics of the schools teaching conservation, with some comparisons of those teaching and those not teaching the subject. These comparisons involve such characteristics as type of school, place of location, size of enrollment, and source of funds. Analysis of schools teaching conservation is made in terms of the various aspects of conservation taught (soils, water, forests, minerals, etc.), the number of instructors teaching the subject, the academic fields in which the subject is offered, the organization of the subject into courses, and kindred points.

One of the desirable components of a survey of this type is a report from the administrative officers of each college and university included in the study. These officers are likely to have the final say in the matters of institutional policy, or at least to exert a powerful influence on policy-making; they are also in a position to know what goes on within the institutional walls, and presumably know, in formal terms at least, what is the nature of the curriculum. These officers are also in a position to know what educational policies are in the making, and consequently whether any subject, such as

## AREA OF LOCATION

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TABLE 8  
RELATIONSHIP OF GEOGRAPHICAL AREA OF LOCATION TO CONSERVATION TEACHING\*

Area	Percentage Teaching Conservation				
	All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) Northeast	44 ( 244)	38 (120)	85 ( 47)	34 ( 33)	25 (44)
(B) Southeast	46 ( 242)	46 (143)	86 ( 22)	40 ( 63)	7 (14)
(C) Southcentral	61 ( 96)	62 ( 50)	100 ( 6)	52 ( 33)	71 ( 7)
(D) Northcentral	64 ( 307)	67 (165)	99 ( 44)	50 ( 74)	25 (24)
(E) Pacific	68 ( 98)	54 ( 39)	100 ( 6)	78 ( 96)	57 ( 7)
(F) Mountain	73 ( 37)	50 ( 12)	75 ( 5)	82 ( 17)	100 ( 3)
Total	(1024)	(529)	(130)	(266)	(99)

\* In most tables in the chapter, except where otherwise noted, data are given for schools teaching conservation. The numbers in parentheses indicate the number of schools in the particular category. The number preceding each parenthesis represents the percentage teaching conservation *in that category*. All percentages have been based upon the 1,024 schools that responded to the initial mailing.

schools teaching the subject is smallest in the eastern part of the country and increases in the central and western parts. In a general way, the farther west a school is located the more likely it is to teach conservation. The range of percentages by type of school was wide, but the geographical distribution of teaching schools within types was generally consistent with the pattern for teaching schools as a whole. The major reversal of the westward trend was in Group I (Four-year Colleges and Small Universities), which showed greatest teaching strength in the two central areas.<sup>2</sup>

<sup>1</sup> The Northeast area includes the New England and Middle Atlantic states, as well as Delaware. The Northcentral area includes the East North Central and West North Central groups, and the Southeast area includes both the South Atlantic and East South Central groups. The Southcentral includes the four West South Central states, the Mountain area includes the eight Rocky Mountain states, and the three Western coastal states form the Pacific area.

<sup>2</sup> Most of the other trend reversals were traceable to small numbers of schools in particular cells (i.e., there were only six Mountain Group I colleges) resulting in a relatively heavy percentage weighting for each unit in the cell total. This was espe-

that referral to some other administrator, or even a teacher, for reply was made with a feeling of confidence that the person in question was capable of representing the situation and the viewpoint of the president to the latter's satisfaction.

It was not expected that the administrative view thus obtained would necessarily agree in all respects with the views of the teachers in the various departments offering courses in conservation in these same institutions. The views of the latter were to be obtained by other means. It was believed, however, that the top administrators

TABLE 7

COLLEGES AND UNIVERSITIES\* ANSWERING ADMINISTRATIVE QUESTIONNAIRE,  
CLASSIFIED BY TYPE AND WHETHER TEACHING CONSERVATION

	Total	Type of School			
		4-year Colleges and Small Universities	Teachers' Colleges	Junior Colleges	Special Schools
Total	1024	529	130	266	99
Teaching conservation	566	279	116	141	30
Not teaching conservation	458	250	14	125	69
Percentage teaching conservation	55.3	52.7	89.2	53.0	30.3

\* Does not include 92 land-grant and large universities not sent the administrative questionnaire. For these a catalogue analysis was made.

of the institution were in a better position to give a prompt survey of the conservation work of the institution than a teacher, or even department head, where two or more departments were involved.

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### *Comparison of Teaching and Nonteaching Schools*

It was believed that some major differences would become apparent when teaching and nonteaching schools were compared with respect to a number of important variables. Consequently, the data obtained from the school questionnaire were analyzed by selected variables according to the entire sample of responses, as well as by type of school. The variables chosen were (1) area of location, (2) size of place of location, (3) major curriculum, (4) religious affiliation, (5) source of funds, (6) size of student body, (7) sex of student body. In the following section each variable is discussed separately, after which a summary comparison is made.

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The accompanying tabulation compares the distribution of all teaching and nonteaching schools by geographical area. Of the 566 schools teaching conservation, 62 per cent were located in the central and western areas of the country. The largest single concentration was in the Northcentral area, with 36 per cent of the teaching schools. The next largest concentrations were in the Northeast

Geographic Area	School Type (Per Cent)	
	Teaching (566)	Nonteaching (458)
(A) Northeast	19	28
(B) Southeast	19	28
(C) Southcentral	10	8
(D) Northcentral	36	27
(E) Pacific	11	7
(F) Mountain	5	2
Total	100	100

and Southeast, each having 19 per cent of the teaching schools. But the latter areas had 56 per cent, or nearly three fifths of all nonteaching schools. By contrast, the Mountain and Pacific areas combined had 16 per cent of all teaching schools, but only 9 per cent of all nonteaching schools. The two central areas occupied a median position, with 46 per cent of all teaching schools and 35 per cent of the nonteaching schools.

#### SIZE OF PLACE OF LOCATION

It was assumed that the size of the place in which a school was located would also be an indication of how likely it was to teach conservation. Since conservation has traditionally been conceived of as dealing with rural, rather than urban, materials and problems it was thought that the schools located in essentially rural areas would teach more conservation *than those in urban areas*. This would reflect the interests and objectives of students, as well as the orientation of the school itself.

The foregoing assumption is generally borne out by Table 9. In fact, for all the schools taken together, a consistent relationship prevailed between size of place where located and incidence of

cially true in the Group IV schools, all of whose cell totals were small. In these cases, a shift of even one or two units in either direction would mean rather large shifts in the percentages listed. This, of course, posed a constant source of interpretive error when dealing with percentages dependent upon very unequal numerical categories. Efforts have been made throughout the study to guard against misinterpretation based upon such inequalities. For example, numbers listed in parentheses in the tables signify the actual cases in each cell. Percentages were generally computed on column totals.

TABLE 9  
RELATIONSHIP OF PLACE OF LOCATION TO CONSERVATION TEACHING

Population of Place (In thousands)	Percentage Teaching Conservation				
	All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) 750 and over	32 ( 95)	33 ( 55)	71 ( 7)	36 ( 14)	10 (19)
(B) 200-749	42 ( 89)	45 ( 56)	60 ( 5)	27 ( 15)	39 (13)
(C) 50-199	49 ( 139)	47 ( 70)	100 ( 10)	49 ( 43)	25 (16)
(D) Under 50	62 ( 701)	58 (348)	91 (108)	57 (194)	37 (51)
Total	(1024)	(529)	(130)	(266)	(99)

conservation teaching. Conservation was taught by 62 per cent of schools located in places of under 50,000 population, as opposed to only 32 per cent of schools in places of 750,000 or over. Spacing of the intermediate categories was notably uniform, conservation being taught by 42 per cent of the schools located in places of 200,000-749,000 population, and by 49 per cent of the schools in places of 50,000-199,000. However, among the various group types the relationship was much less consistent. In Group I the trend held, but with less uniformity. Group II had no pattern based upon size, but the combined categories of 50,000 population and over contained few units (83 per cent of all Group II schools were located in places under 50,000, compared with 68 per cent in this category for all schools).<sup>3</sup> Group III was more patterned. Group IV showed little relationship between city size and conservation teaching, but as before, most cell totals in this group were small.

Of the 566 schools teaching conservation, 77 per cent were located in places of less than 50,000 population. In contrast, only 59 per cent of the 458 nonteaching schools were so located. Only 5 per cent of the teaching schools were in places of 750,000 or over,

<sup>3</sup> For all schools, regardless of conservation teaching, the distribution by size of place varied as follows:

Size Category	Per Cent
750,000 and over	8
200,000-749,000	9
50,000-199,000	13
Under 50,000	63

whereas 14 per cent of the nonteaching schools were in cities of this size. This general pattern held for the intermediate city sizes, with 6 per cent of the teaching schools being located in places of 200,000-749,000 population as opposed to 14 per cent of nonteaching schools. Places of 50,000-199,000 population included 12 per cent of all teaching schools, but 16 per cent of the nonteaching schools.

### MAJOR CURRICULUM

The survey included a study of the incidence of conservation teaching as related to the major curricular interests of the colleges and universities surveyed. Five curriculum categories were established.<sup>4</sup> These categories, together with the total number of schools included in each and the percentage teaching conservation, are as follows: (1) Education (130 schools, 89 per cent), (2) Diversified (253 schools, 63 per cent), (3) Liberal Arts, Arts and Sciences (444 schools, 51 per cent), (4) Specialized, Technical (99 schools, 30 per cent), (5) Undetermined (98 schools, 33 per cent). Probably one factor contributing to the high incidence of conservation teaching in colleges of education and in education curricula is the growing number of states that have laws making such teaching a mandatory part of training for public school teacher certificates.

The following tabulation indicates the percentage of all teaching and nonteaching schools falling under each major curriculum category.

Major Curriculum	School Type (Per Cent)	
	Teaching (566)	Nonteaching (458)
(A) Specialized, Technical	5	15
(B) Liberal Arts, Arts and Sciences	40	47
(C) Diversified	28	21
(D) Education	21	3
(E) Undetermined	6	14

The percentages for Liberal Arts, Arts and Sciences and for Diversified indicate that these curricula were not discriminatory between teaching and nonteaching schools. The remaining categories, however, were highly discriminatory. Nevertheless, since Liberal Arts, Arts and Sciences and Diversified constituted 68 per cent of both school types, it must be said that this variable as a

<sup>4</sup>Curriculum categories were determined by consulting the information for each school found in the 1934 edition of *American Universities and Colleges*, edited by the American Council on Education. If a school was not listed in this source, its catalogue was examined to determine the appropriate curriculum category. If neither of these sources yielded the desired information, the school was placed in the Undetermined category.

whole was not a good indicator of conservation teaching for most schools in the sample.

### RELIGIOUS AFFILIATION

The school questionnaire did not provide information concerning the religious affiliation of the institutions responding. Yet the authors felt that since these connections did exist in many schools, it would be well to examine them in relation to conservation teaching. It was assumed, not that only particular religious doctrines or groups took specific account of conservation as an educational field, but rather that the over-all emphases and objectives of differently affiliated schools might have some bearing on the time and effort devoted to the subject.

Table 10 indicates that religious affiliation of a school was markedly related to the incidence of conservation teaching. The trend was consistent, although degrees of difference varied, among the four type groups. Certain variations in Group II reflect small cell totals in all categories except C, since practically none of the

TABLE 10  
RELATIONSHIP OF RELIGIOUS AFFILIATION TO CONSERVATION TEACHING

Religious Category	Percentage Teaching Conservation				
	All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) Catholic	33 ( 141)	35 (113)	50 ( 6)	33 ( 15)	0 ( 7)
(B) Protestant	52 ( 271)	56 (210)	100 ( 2)	35 ( 54)	20 ( 5)
(C) None	68 ( 519)	69 (147)	92 (121)	61 (183)	41 (63)
(D) Other and Un- determined	31 ( 93)	37 ( 59)	0 ( 1)	43 ( 14)	5 (19)
Total	(1024)	(529)	(130)	(266)	(99)

The tabulation that follows shows the percentage of all teaching and nonteaching schools falling under each religious category.

Religious Affiliation	School Type (Per Cent)	
	Teaching (566)	Nonteaching (458)
(A) Catholic	8	21
(B) Protestant	25	23
(C) None	62	37
(D) Other and Undetermined	5	14
Total	100	100

Teachers' Colleges had any religious affiliation. For the three largest categories, the table shows clearly that the incidence of conservation teaching was smallest in Catholic institutions and greatest in schools with no religious affiliation, with Protestant-affiliated schools occupying a middle position. This trend was generally consistent throughout the four type groups of institutions.

Religious affiliation categories had a pattern resembling that of the categories under Size of Place of Location, in that the first and last categories were discriminatory in opposite directions. However, the more even distribution of category sizes made the results more valid in the Religious Affiliation variable. The pronounced reversal in Catholic and None suggested that these two categories were definitely related to conservation teaching.

### SOURCE OF FUNDS

A marked relationship was found to exist between conservation teaching and source of institutional funds. Conservation was taught in 78 per cent of the 378 schools supported mainly by public funds (federal, state, county, or municipal), but in only 52 per cent of the 635 schools supported mainly by funds from private sources (churches, corporations, foundations, alumni, students, individuals, etc.).<sup>5</sup> This trend was consistent throughout the four type groups of institutions. In Group I (Four-year Colleges and Small Universities), conservation was taught by 83 per cent of the publicly supported schools, as opposed to 48 per cent of the privately supported schools. For the remaining type groups, percentages of schools teaching conservation were: Group II (Teachers' Colleges), public 83 per cent, private 48 per cent; Group III (Junior Colleges), public 64 per cent, private 38 per cent; Group IV (Special Schools), public 52 per cent, private 29 per cent. Thus every publicly supported group of schools considerably exceeded the corresponding privately supported group in percentage teaching conservation.

The tabulation on page 73 shows the percentage of all teaching and all nonteaching schools falling under each source of funds.

Within the teaching school type, source of funds was completely nondiscriminatory, but it was markedly discriminatory in the nonteaching type. However, the fund categories themselves were

<sup>5</sup> Many schools, of course, drew funds from both public and private sources, but in nearly all cases one fund category clearly predominated. Eleven schools, marked Unspecified, were not included in the tabulations.

Source of Funds	School Type (Per Cent)	
	Teaching (566)	Nonteaching (458)
(A) Private	50	77
(B) Public	50	21
(C) Unspecified	0	2

highly discriminatory between school types. Publicly supported schools were heavily on the teaching side, while privately supported schools were definitely, although less heavily, on the nonteaching side.

### ENROLLMENT

A study was made to determine the relationship between the size of student body and the incidence of conservation teaching. The results as shown in Table 11 indicate that, up to a point, the larger a school is, the more likely it is to teach conservation. In none of the type groups was there an inverse relationship between size of enrollment and conservation teaching. In no type group was conservation taught by as many as half of the schools enrolling fewer than 500 students, except for Teachers' Colleges, which had a high incidence of conservation teaching in all enrollment categories. But even in the Teachers' Colleges, conservation was taught by only 84 per cent of the 81 institutions averaging 899 students or less, as opposed to 98 per cent of the 46 institutions enrolling 900-2,499 students, and 100 per cent of the three institutions enrolling 2,500 or more. In the remaining type groups, conservation was taught by approximately two thirds to four fifths of the institutions enrolling 2,500 or more students.

TABLE 11  
RELATIONSHIP OF SCHOOL ENROLLMENT TO CONSERVATION TEACHING

Enrollment	Percentage Teaching Conservation				
	All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) Under 500	46 ( 490)	46 (212)	84 ( 38)	45 (187)	22 (53)
(B) 500- 899	57 ( 224)	50 (135)	84 ( 43)	62 ( 34)	33 (12)
(C) 900-2,499	69 ( 221)	62 (117)	93 ( 46)	77 ( 35)	35 (23)
(D) 2,500-6,999	69 ( 89)	65 ( 65)	100 ( 3)	80 ( 10)	64 (11)
Total	(1024)	(529)	(130)	(266)	(99)



The accompanying tabulation gives the percentage of all teaching and all nonteaching schools under each enrollment category.

School Enrollment	School Type (Per Cent)	
	Teaching (566)	Nonteaching (458)
(A) Under 500	39	57
(B) 500- 899	23	21
(C) 900-2,499	27	15
(D) 2,500 and over	11	7
Total	100	100

From this tabulation it is obvious that nonteaching decreased as schools became larger, and also that nonteaching schools were more likely to be small schools than the teaching schools. Since Under 500 accounted for nearly half of all the schools in the entire sample, it is not surprising to find it the largest category among teaching schools, even though not in the majority of this school type. There is less of a continuous pattern among teaching schools than in the nonteaching ones. However, in the school type comparison by enrollment categories, the relative strength of nonteaching schools Under 500 and the corresponding strength of teaching schools in groups 900-2,499 and 2,500 and over indicates that enrollment size was a definite factor in conservation teaching, even though the group 500-899 was nondiscriminatory between types. This generally substantiates the data in Table 11, except further to decrease the discriminatory effect in the group 500-899 and to increase the discrimination in the group Under 500.

### SEX OF STUDENT BODY

A definite relationship was found to exist between conservation teaching and sex composition of student bodies. For all schools, numbers and percentages teaching conservation were as follows: (1) Male (91 schools, 26 per cent), (2) Female (146 schools, 41 per cent), (3) Coeducational (751 schools, 62 per cent), (4) Unspecified (36 schools, 53 per cent). The extent of the relationship varied within type groups, but the direction of variation was consistent.

The tabulation on page 75 shows the percentage of all teaching and all nonteaching schools falling under each sex category.

The patterns in both school types were similar with respect to sex of the student body, with a slightly wider range in the teaching type. In type comparison, Male was most discriminatory, although it accounted for a relatively small percentage of schools in both

Sex of Student Body	School Type (Per Cent)	
	Teaching (566)	Nonteaching (458)
(A) Male	4	15
(B) Female	11	19
(C) Coeducational	82	62
(D) Unspecified	3	4

classes of school. There was a reversal in Coeducational as compared with Male and Female, but by itself Coeducational was less discriminatory than might have been surmised, since more than two thirds of the total sample was found there. Thus the fact that a school admitted male or female students only was a fairly reliable indication that it did not teach conservation. The fact that a school was coeducational gave only a slight indication that it did teach conservation.

## SUMMARY

In order to gain greater insight into the characteristics of schools teaching conservation and schools not teaching conservation, a composite analysis utilizing seven variables was made. Tables incorporating these data were all arranged in identical fashion, with a rank order of categories progressing from lowest to highest incidence of conservation teaching. From this arrangement, two polar extremes of clusters of variables discriminatory with respect to conservation teaching were determined. Those categories markedly discriminatory are starred in Table 12, while those markedly discriminatory but not polar are added in parentheses. Other polar categories were less discriminatory.

The polar categories were derived by grouping the highest and lowest categories for the seven variables used. As a result of this grouping, it could now be said that any school locating all seven variables among the categories of Column X would almost certainly be teaching some conservation, while a school locating all seven variables in the categories of Column Y would almost certainly not be teaching conservation. Of course, most schools did not reflect these polar type clusters on all variables. Since four of the variables were discrete, one dichotomous, and two continuous, a large number of combinations were possible among the polar types. Furthermore, many schools combined both X and Y characteristics for some variables, with nondiscriminating categories in others.

It should be pointed out that the number of combinations of the variable categories was empirically limited. In practice, many

TABLE 12  
DISCRIMINATORY CATEGORIES WITH RESPECT TO INCIDENCE OF  
CONSERVATION TEACHING (ALL SCHOOLS)

Variable	Column X. Categories for Teaching Schools	Column Y. Categories for Nonteaching Schools
Area of location	Western	Northeast, Southeast
Size of place of location	Under 50,000	750,000 and over* (200-749)
Major curriculum	Education*	Specialized,* Technical
Religious affiliation	None*	Catholic*
Major source of funds	Public*	Private
Enrollment	2,500 and Over* (900-2,499)	Under 500
Sex of student body	Coeducational	Male* (Female)

\* Markedly discriminatory (Ratio of 2:1 or more in either direction).

( ) Nonpolar but markedly discriminatory.

combinations were restricted by cultural and social factors. For example, schools whose major curriculum was education were almost always supported by public funds, and those with diversified curricula also tended to have enrollments over 2,500, and to be coeducational. That is, clusters of variables were linked in empirical patterns. These clusterings did not mean that any particular variable was necessarily antecedent (the "key" variable) to all the others, but simply that certain categories generally seemed to be found together and that certain categories were mutually exclusive. If clusters contained more Column X or near-Column-X type categories, the schools in such clusters were more likely to be teaching conservation than those in clusters which contained predominantly Column Y or near-Column-Y type categories.

Examples of these empirical "mixed clusters" are shown in Table 13.

The examples given in Table 13 correspond to noticeable clusters found in the entire sample of schools. Example One is a seven-variable picture of the average small, midwestern liberal arts college that has Protestant affiliation. Many of the large urban universities of the Northeast correspond to Example Two. The numerous junior colleges on the Pacific Coast fall into Example Three.

By the use of the data for each of the seven variables as given in the preceding pages, those characteristics that seem related to the incidence of conservation teaching may be delineated with a fair degree of accuracy, and the likelihood that a school will be found

TABLE 13

EMPIRICAL "MIXED CLUSTER" TYPES OF SCHOOLS WITH RESPECT TO INCIDENCE OF CONSERVATION TEACHING (ALL SCHOOLS)

Variable	Categories: Example One	Categories: Example Two	Categories: Example Three
Area of location	Northcentral	Northeast	Pacific
Place of location	Under 50,000	750,000 and over	50,000-199,000
Major curriculum	Liberal Arts, Arts and Sciences	Diversified	Diversified
Religious affiliation	Protestant	None	None
Major source of funds	Private	Private	Public
Enrollment	500-899	2,500 and over	Under 500
Sex of student body	Coeducational	Male	Coeducational
Is school likely to teach conservation?	No	No	Yes

teaching conservation may be determined with a degree of success somewhat better than chance.

### *Internal Characteristics of Schools Teaching Conservation*

In the first section of this chapter, a comparison of teaching and nonteaching schools was made on the basis of seven variables. This second section further examines the schools teaching conservation in terms of the form and content of their offerings. This information was derived mainly from Questions 6 through 11, plus Question 13, of the administrative questionnaire.<sup>6</sup>

### ASPECTS TAUGHT

It was possible not only to determine the aspects of conservation taught in the various types of schools, but also to discover which aspects received special attention. The figures of Table 14 show that the aspects of conservation fell into two fairly distinct groups according to the frequency with which taught. Those taught most frequently were Soils, Water, Forests, Minerals, and Wildlife; those taught less frequently were Ecology, Recreation, Range Management, Oceanography, and Other. This general ranking prevailed with marked consistency throughout the four type groups of schools. The percentage levels for all aspects were highest in Group II (Teachers' Colleges). Thus the type of school that did the most teaching of conservation also seemed to cover the most aspects of the subject.

<sup>6</sup> See the Appendix. The remainder of this questionnaire is considered in a subsequent chapter.

Each school was asked to indicate the aspects of conservation receiving special emphasis in its program of instruction. The tabulated replies revealed an order of frequency for aspects emphasized not differing greatly from the order for aspects taught, as shown in Table 14. For all schools the complete frequency ranking, from highest to lowest, was as follows: Soils-Forests-Water-Wildlife-

TABLE 14  
ASPECTS OF CONSERVATION TAUGHT, BY TYPE OF SCHOOL

Aspects Taught	Percentage of Schools Reporting				
	All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) Oceanography	7	9	10	4	0
(B) Range management	18	16	18	20	20
(C) Recreation	34	38	41	24	20
(D) Ecology	45	53	54	25	23
(E) Wildlife	64	64	78	60	33
(F) Minerals	66	67	79	56	53
(G) Forests	70	67	83	69	47
(H) Water	71	69	83	66	63
(I) Soils	79	78	88	78	63
(J) Other	6	8	9	2	3
Total Schools	(566)	(279)	(116)	(141)	(30)

Ecology-Minerals-Recreation-Range Management-Oceanography. A large number of teaching schools did not report any aspects as receiving special emphasis. The greatest tendency toward special emphasis was found in Group II (Teachers' Colleges), where 20 per cent of all teaching schools reported giving special emphasis to Soils, 18 per cent to Forests, and 14 per cent to Water. Soils was the leading aspect to receive emphasis in every type group, being reported by 20 per cent of teaching schools in Group II, 13 per cent in All Schools, Group III, and Group IV, and 10 per cent in Group I.

In general, then, both in frequency of teaching and in special emphasis, the aspects of resource conservation showed a reasonably consistent rank order pattern by category distribution. With minor exceptions, these patterns were also consistent in the four type groups. In addition, the relative percentages were similar to the distribution patterns for incidence of conservation teaching found in the first section of this chapter.

#### TEACHING DEPARTMENTS

A wide range of departments reported some conservation teaching. In Table 15 these have been grouped into nine Field Categories.

The high categories in incidence of conservation teaching were Natural Science and Physical Science; the medium categories, Geography, Social Science, and Agricultural Science; the low categories, Physical Education, Education, and Business. Thus if conservation was taught in a school, the most probable place in the curriculum was in courses given in the natural and physical sciences.

TABLE 15

FIELDS IN WHICH CONSERVATION IS TAUGHT, BY TYPE OF SCHOOL

Field Category*	Percentage of Times Cited, by Type Group				
	All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) Business	1	2	0	1	0
(B) Education	8	5	20	4	3
(C) Physical Education	8	9	5	8	0
(D) Agricultural Science	17	11	10	33	37
(E) Social Science	20	19	25	20	17
(F) Geography	25	25	45	14	3
(G) Physical Science	42	39	54	37	43
(H) Natural Science	68	71	74	66	33
(I) Not Specified	2	1	6	2	7
Total Schools	(566)	(279)	(116)	(141)	(30)

\* Departments included under the respective field categories were as follows: (A) *Business*: Commerce, Accounting, Business Law; (B) *Education*: Teaching, Nursing, School Administration; (C) *Physical Education*: Physical Education, Camping, Recreation; (D) *Agricultural Science*: Forestry, Agronomy, Soils, Agricultural Engineering; (E) *Social Science*: Economics, Political Science, History, Sociology; (F) *Geography*: Geography; (G) *Physical Science*: Geology, Chemistry, Physics, Engineering; (H) *Natural Science*: Biology, Botany, Zoology.

Although the fields of learning indicated in Table 15 do not represent what are customarily called "subject-matter departments," the contents of the table must be regarded, to some extent, as a reflection of departmental organization. At the college level, many specific courses may be offered in different departments, varying with the size and type of school. The reasons for this variation may often be found in administrative circumstance rather than in any logic inherent in the subject matter itself. Consequently, the subject of conservation, which may logically be offered in several different fields of learning, depending upon the point of view from which it is taught, is found in a variety of departments. This may reflect the interest and promotional efforts of certain teachers functioning in these areas. Thus, the customary association of conservation with such fields as Natural Science and Physical Science,

plus the fact that these fields, or departments, are found in most colleges and universities regardless of type, probably accounts for the relatively high degree of uniformity with which the subject is offered in these fields. On the other hand, the fact that in some types of schools certain fields, such as Geography, are not taught probably accounts for the low association of conservation with those fields in Junior Colleges and Special Schools. The same explanation may account for the relatively low association of conservation with Agricultural Science in the Teachers' Colleges and the Four-year Colleges and Small Universities. Again, it may be that the relatively high association of conservation with Education is the result of a too broad definition of Education in reporting the areas in which conservation is taught. Such an interpretation might easily occur in institutions where most courses, regardless of subject matter, are presented to teachers or prospective teachers, and taught from the point of view of how the content should be presented to elementary and secondary pupils.

In spite of these qualifications, it remains clear that conservation is most generally taught in the Physical and Natural Science fields, with Geography and Social Science in a secondary position. Except in the Teachers' Colleges, the fields of Education, Physical Education, and Business offer little by way of instruction in conservation.

### MAJOR AND DEGREE

Only 6 per cent of all schools teaching conservation offered a major in the subject, and only 1 per cent offered a special degree in conservation. No marked variations were found among type groups of schools, except in the Special Schools, where 17 per cent offered conservation as a field of concentration and 7 per cent awarded a special degree. The smaller number of schools in this group made the percentages less significant than if they had occurred in the other type groups of schools. It must be remembered that the Land-Grant and Large Universities were not included in the sample, and that their data show different results on these variables (see "Conservation Teaching in the Land-Grant and Large Universities," this chapter). Nevertheless, one may conclude that, in the 566 schools on which the above percentages are based, the treatment of the subject was probably informative and generalized rather than occupational and specialized.

### COURSE ORGANIZATION

The manner in which conservation subjects were incorporated into the various curricula provided some measure of the depth and

emphasis with which they were treated. Conservation was sometimes taught in separate courses, and sometimes woven into courses in related or pertinent fields.

TABLE 16

COURSE ORGANIZATION OF CONSERVATION TEACHING, BY TYPE OF SCHOOL

Course Organization	Percentage of Schools				
	All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
Special courses only	16	19	18	12	7
Both special and integrated courses	30	32	50	13	25
Integrated courses only	50	45	32	72	60
Unknown	4	4	0	3	8
Total	(100)	(100)	(100)	(100)	(100)

The figures in Table 16 indicate clearly that in most schools the teaching of conservation is not done in special conservation courses, but is incorporated into other courses. Less than one fifth of the teaching schools in any type group reported that conservation was taught only in special courses, while 50 per cent of All Schools reported that conservation was taught only in integrated courses. However, only 11 per cent reported that the subject was integrated into *many* courses, as opposed to 39 per cent reporting it as integrated into a few courses. Only 26 per cent of All Schools reported Special Courses Only or Special Courses and Integrated into Many. All in all, the evidence from replies to questionnaires indicates that most schools teach conservation as a part of a few courses, particularly biological or physical science courses, devoting a small amount of time to specific conservation subject matter.

Group I followed the All Schools pattern closely, except for a slight tendency to have more Special Courses than the sample as a whole. Group II showed a decided emphasis on Both Special and Integrated Courses. Groups III and IV showed a very strong tendency toward Integrated Courses Only. The latter two types of groups were least inclined to offer conservation in Special Courses Only.

Thus the manner of course treatment was found to differ widely in terms of type groups, even though Group I was rather close to the main sample distribution. The opposite emphasis of Group II as compared with Groups III and IV showed that treatment of con-



servation in the curriculum was definitely related to the type of school teaching the subject.

Differences in course treatment were also found to be related to the type of major curriculum in the various institutions studied. On the whole, the cross-tabulation of course treatment by major curriculum yielded distributions rather similar to those found in Table 16. This strengthened the notion that certain types of schools were linked to certain kinds of curricula, and that these two factors were related to particular methods of handling conservation.

### NUMBER AND TRAINING OF TEACHERS

In addition to the departmental pattern and the manner of course organization already considered, the number and training of teachers giving conservation work in their courses provided evidence of the extent and quality of such work.

On the average, nearly one school in four had two staff members teaching conservation, and 44 per cent had either one or two such teachers. Approximately three schools in five employed one, two, or three teachers who taught some conservation, and nearly three in four of the schools had fewer than five such teachers. Only 14 per cent had six or more teachers of conservation (see Table 17).

TABLE 17  
NUMBER OF PERSONS TEACHING CONSERVATION, BY TYPE OF SCHOOL

Number of Teachers	Percentage of Schools				
	All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) Six	6	4	10	4	10
(B) Seven and over	8	9	9	8	14
(C) Five	8	7	9	6	10
(D) Four	10	7	10	13	3
(E) Three	19	19	21	16	20
(F) One	20	24	16	18	3
(G) Two	24	23	22	29	27
(H) Not specified	5	7	3	6	13
Total	(100)	(100)	(100)	(100)	(100)

The group of Four-year Colleges and Small Universities followed the All Schools pattern closely; but the Teachers' Colleges had more conservation teachers than the average. Only 38 per cent had but one or two such teachers, and 19 per cent employed six or more. On the other hand, the Junior Colleges had fewer conservation

teachers than the average. Forty-seven per cent of these schools employed but one or two conservation teachers, and only 12 per cent had six or more. The Special Schools rarely had but one such teacher, and only 30 per cent had either one or two. On the other hand, nearly one in four had six or more teachers of conservation, and more than one in three had five or more such teachers.

It seems apparent from this and other evidence that the special position of the Teachers' Colleges, where conservation teaching is given more than average emphasis, and where both integrated and special courses in conservation are employed, is reflected in the larger average number of persons teaching the subject. In the Special Schools, where integrated courses rather than special courses in conservation are emphasized, it may be that this practice results in the relatively large numbers of teachers involved in presenting the subject.

It will be noted that three fifths to two thirds of the schools in all except Group IV had fewer than four teachers of conservation. It is obvious that in most schools the teaching of conservation is in the hands of a very small fraction of the total teaching staff.

Information was sought on the school questionnaires as to the number of teachers in each school having special training in conservation. The replies to this query were not very satisfactory. From 14 to 25 per cent of the schools, by type group, failed to supply any information on the point. The data available do indicate some correlation between the number of conservation teachers per school and the number possessing special training; i.e., as the total number of teachers increased, the number with special training also increased. The All Schools tabulation showed results as follows: 21 per cent reported one teacher with special training, 19 per cent reported two, and 11 per cent reported three. Percentages for the remaining categories were: four, 5 per cent; five and six, 2 per cent each; seven and over, 4 per cent. Sixteen per cent reported "None" and 20 per cent supplied no information. The pattern of responses received from Type Groups I and III was rather similar to the All Schools pattern. Group II (Teachers' Colleges) diverged most significantly in the category "None," which was reported by only 6 per cent of the schools in this type group, indicating that more teachers in the Teachers' Colleges had special conservation training than in other types of schools. The distribution of percentages under Group IV (Special Schools) was very erratic as compared to the pattern for All Schools. Twenty-seven per cent reported "None" for teachers with special training—considerably the highest percentage of any type group.

## TEACHING AIDS

In order to supplement regular lectures and class discussions, other kinds of teaching aids were utilized in conservation teaching, their extent and frequency being dependent upon the class time and the financial resources available.

TABLE 18  
AIDS USED IN CONSERVATION TEACHING, BY TYPE OF SCHOOL

Teaching Aid	Percentage of Schools Reporting				
	All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) Visiting lecturers	45	42	63	38	30
(B) Special laboratory work	48	44	60	46	50
(C) Field trips	81	78	92	82	67
(D) Visual aids	82	79	97	85	47
(E) Not specified	3	2	2	5	13
Total	(566)	(279)	(116)	(141)	(30)

As shown in Table 18, the use of teaching aids was clearly variable according to categories. The low categories, Visiting Lecturers and Special Laboratory Work, were similar within the first three type groups, as were the high categories, Field Trips and Visual Aids. Group II had a generally higher level of citation for all categories, although the pattern of categories was similar to that of Groups I and III. Group IV deviated from the predominant pattern. Thus, while the categories were discriminatory in the entire sample, tabulation by type groups showed little variation, except the relative strength of Group II in all categories. The Teachers' Colleges, then, appeared to make greater use of teaching aids than other types of schools.

## EXTENSION, CONFERENCES, AND SHORT COURSES

In addition to regular course work for resident students, conservation material was also offered by schools to part-time or non-resident students in courses specially designed around particular topics. Such courses were usually of relatively short duration, as well as being more concentrated in content than the regular resident courses.

Of the schools teaching conservation, 69 per cent were reported as offering no extension, conference, or short course work. (The

percentages reporting "None" by type group were: Group I, 73 per cent; Group II, 48 per cent; Groups III and IV, 77 per cent each. No data were supplied by 7 per cent of All Schools, Group I, and Group III; 3 per cent of Group II; and 11 per cent of Group IV.) Not more than 5 per cent of all schools offered any one type of work among the following: Extension Courses, Conferences and Workshops, Summer Courses, Short Courses for Professionals, Co-operative Courses with Outside Agencies, Evening Courses, or Extension Courses and Workshops. Some schools offered more than one type. The Teachers' Colleges had a clear lead in such activities, about half of them offering some such work. As compared with All Schools and other type groups, the Teachers' Colleges were outstandingly high in two categories of work: Conferences and Workshops (17 per cent) and Extension Courses (16 per cent). Junior Colleges and Special Schools offered the smallest amount of extension, conference, or short course work.

A further examination of the distribution of extension and special courses was made in terms of several of the variables used in "Comparison of Teaching and Nonteaching Schools," this chapter. It became clear that extension courses and other special courses in conservation education were concentrated in those schools that were publicly supported, coeducational in organization, and that had student enrollments of 2,500 or more. Such courses were offered least often by schools privately supported by religious groups, and having enrollments of fewer than 500 students. Schools admitting only one sex also offered few such courses.

Table 19 is a summation of the "most likely" and "least likely" categories among the teaching variables considered in the present section. In the table, the first mentioned category in each column is the polar one for its variable. Those categories close to the pole are then mentioned in descending order of importance. The real difference between the two columns is that Column X represents a plausible empirical type, whereas Column Y does not.<sup>7</sup>

### *Conservation Teaching in the Land-Grant and Large Universities*

In Chapter 4, it was pointed out that the size and diversity of large institutions made the use of the administrative questionnaire inappropriate for them. It would have been difficult to assign responsibility for gathering information, since many of these schools

<sup>7</sup> For instance, one would never find Oceanography taught in the field of business, nor is it likely to be integrated into many courses.

TABLE 19  
DISCRIMINATORY CATEGORIES WITH RESPECT TO THEIR INCIDENCE

Teaching Variable	Among Teaching Programs	
	Column X "most likely" Categories	Column Y "least likely" Categories
Aspects taught	Soils, Water, Forests	Oceanography, Range management
Aspects emphasized	Soils, Forests	Oceanography
Teaching fields	Natural Science Physical Science	Business, Education, Physical Education
Major and degree	None	None
Course treatment	Integrated into a few Courses	Special, Integrated into many
Number of teachers	Two, one, three	Four and over
Number of teachers with conservation training	One, two, none	Four and over
Teaching aids used	Visual aids, Field trips	Visiting Lecturers, Special laboratory work
Extension, conferences, and special courses	None (Extension courses, Conferences, and Workshops)	None (Evening, Extension courses, and Workshop)

have complex curricula covering many departments. Therefore, a content analysis of the course offerings in the catalogues of these schools was undertaken in order to determine some of the main characteristics of the incidence of their conservation teaching. Admittedly, some of the variables derived for the teaching schools in the mailed questionnaire sample were not obtainable from the catalogue analysis of courses, but certain elements of the pattern for this group of schools could be ascertained. However, because of the different method of approach in gathering the data, it was felt that this group of schools should be discussed separately.

#### STRUCTURAL AND ORGANIZATIONAL CHARACTERISTICS

Following the procedure begun in "Comparison of Teaching and Nonteaching Schools," this chapter, the characteristics of this group of schools were determined with respect to the seven structural variables. The major characteristics that separated this whole group from the questionnaire schools were the size of their enrollment and the fact that they were operated under land-grant auspices.

Thus, if a school had seven thousand or more students it was included in this group, and land-grant institutions were included regardless of enrollment. Within the tables it was useful to separate the land-grant schools from the remainder of the group in order to point up certain differences between the two subgroups.<sup>8</sup>

*Geographical Location.* Table 20 indicates a distribution of schools that corresponds roughly to that found in the questionnaire schools, with Northeast, Northcentral, and Southeast accounting for the bulk of the institutions. With respect to numbers in the land-grant type, however, there was wide variation. This was to be expected, since land-grant colleges are usually equal to the number of states within any particular area, except in the South where some states have separate land-grant schools for Negroes. This accounts for the generally higher percentages of these schools located in Southcentral and Southeast areas.

TABLE 20  
GEOGRAPHICAL LOCATION OF LAND-GRANT AND OTHER LARGE UNIVERSITIES

Area of Location	School Type			Percentage Land-Grant
	All Schools	Land-Grant	Other	
(A) Northeast	24	8	16	33
(B) Pacific	9	4	5	44
(C) Northcentral	21	11	10	52
(D) Southcentral	8	5	3	63
(E) Mountain	11	8	3	73
(F) Southeast	19	15	4	79
Total	92	51	41	55

*Size of Place of Location.* When the Land-Grant and large Other universities were compared as to size of place of location, a sharp difference was revealed. Of the 51 Land-Grant schools, 38 were located in places of less than 50,000 population and an additional 9 were found in places of 50,000-199,000. Only 3 were located in places of 200,000-749,000 population, and only 1 was found in a city of 750,000 or over. In contrast, of the 41 Other universities, 20 were located in places of 750,000 or over. Five were located in places of 200,000-749,000 population, an additional 5 in places of 50,000-199,000, and 11 in places of less than 50,000 population. Of the 20 Other schools found in places of 750,000 or over,

<sup>8</sup> Most of the tables in this section are given in actual numbers rather than in percentages, because of the small sample of schools involved. Where percentages are used they are specified as such.

12 were located in the Northeast and 5 in the Northcentral area, both regions of high urbanization. Thus the data showed that the Other schools were often metropolitan universities, which might be expected to have the same kind of conservation teaching as was found in the mailed questionnaires received from schools located in this environment (see "Comparison of Teaching and Nonteaching Schools," this chapter).

*Major Curriculum.* All the schools in the group, except one which was classified as Specialized-Technical, had curricula of a Diversified type.

*Religious Affiliation.* Only four schools, three of these being Catholic, were affiliated officially with religious organizations. All four were located in cities of 200,000 or more, and no two were in the same geographic area.

*Major Source of Funds.* Since the major financial support of all land-grant colleges is of public origin, these schools were not differentiated from each other on this particular variable. Of the 41 Other schools, 18 were classified as Public and 23 as Private with respect to major source of funds. All but 6 of the Private universities were found in either the Northeast or the Northcentral area, as were 9 of the 18 Public Universities. The remaining schools, whether Public or Private, were rather evenly spread throughout the other geographical areas of the country. The Northeast was the only area in which Private universities predominated (12 were found here, as opposed to only 4 Public ones). Most of the Public schools were state or municipal universities.

*Size of Enrollment.* Differences in categories of school size were found only among the Land-Grant schools, since all of the Other schools enrolled over 7,000 students. Of the 51 schools of the Land-Grant type, 19 had fewer than 4,000 students, 11 were in the 4,000-7,000 category, and 21 had enrollments of over 7,000. The main cluster of Over 7,000 schools was formed by 9 Northcentral schools, the remaining ones in this size category being spread fairly evenly throughout the country. The principal cluster of 4,000-7,000 schools was formed by 6 institutions in the Southeast. Of the 19 Under 4,000 schools, 6 were found in the Mountain area, 6 in the Southeast, and 4 in the Northeast.

*Sex of the Student Body.* All the schools in the group, with the exception of five in the Other type, were Coeducational. Two of the five were in the Male category, while the remaining three were Male on the undergraduate level and Coeducational on the graduate level. All five schools were located in the Northeast area.

*Summary.* A recapitulation of the organizational variables in this classification of schools indicates that three variables were not discriminatory within the group, since nearly all the schools had diversified curricula, no religious affiliation, and coeducational student bodies. Each of two other variables was discriminatory to one of the type groups. The major source of funds varied in the Other type, while size of enrollment varied in the Land-Grant type. Only with respect to size of city and regional location did the group vary as a whole. Since the structural variables did not apply in all categories, the construction of extreme type configurations was not as discriminatory as in the previous application of this procedure among the mailed samples.

TABLE 21

DISCRIMINATORY CATEGORIES FOR LAND-GRANT AND OTHER TYPES OF SCHOOLS

Variable	Type Group	
	I Land-Grant	II Other
1. Geographic area	Southeast, Mountain	Northeast
2. Size of place of location	Under 50,000	750,000 and over
3. Major curriculum	Diversified	Diversified
4. Religious affiliation	None	None
5. Major source of funds	Public	Private
6. Size of enrollment	Under 7,000	Over 7,000
7. Sex of student body	Coeducational	Coeducational

*Nevertheless, it was possible to list basic differences between Land-Grant and Other schools. The dichotomy was formulated in this way, instead of between teaching and nonteaching schools, because only a handful of schools in the group did not teach conservation. Only six institutions offered no conservation at all and only one of these was a Land-Grant institution. Nineteen schools, of which five were of the Land-Grant type, offered three courses or less.<sup>9</sup> Thus, while conservation teaching was not generally a dichotomizing variable for the group as a whole, there was evidence that the Land-Grant type was inclined to do more of such teaching than the Other type.*

It is worth noting again that some minor variations from unanimity in both types of schools for Variables 3, 4, and 7 occurred

<sup>9</sup> While three courses might well be considered an ample or even heavy emphasis for many schools in the mailed questionnaire sample, it was felt that this amount of teaching was relatively small for the group considered in this section. This is another instance where absolute comparisons of schools on certain quantitative characteristics could be misleading. Other variables would have to be taken into account before assessing relative emphasis upon conservation teaching among the several type groups.



within Group I. For Variable 5, the distribution of categories was very close in Group II, and unanimous in Group I. The major differentiations occurred in Variables 1 and 2, in which the metropolitan schools of the Northeast area were contrasted with the schools of the more rural Southeast and Mountain regions.

Of course, between these extreme types were many schools that combined several characteristics from both groups. For example, in the Northcentral area, which contains a number of schools, the discriminatory categories (excluding of course, Variable 1) for Land-Grant institutions were the same as those shown in Table 21 for the country as a whole, except for size of enrollment. Here the discriminating category was Over 7,000, since the Land-Grant schools in the area were considerably larger than those for the country as a whole. The reason seemed to be that the states in the area were generally populous and of a high economic level, providing both a large enrollment and liberal financing for the land-grant institutions.

In spite of the fact that they were not dichotomized on the same variable, the profiles in Table 21 may be compared with those of Table 12. On making such a comparison, one is struck by the fact that for most variables the Column X group of Table 12 is the same as the Land-Grant group of Table 21. On the other hand, the Column Y group shows major differences from both groups in Table 21, except for Variables 1 and 2, where it is similar to Group II. Thus, it would appear that the size of enrollment and major curriculum of Group II schools were sufficient, in most cases, to overcome the tendency of schools in large cities and highly urbanized areas to teach no conservation. *Even so, the amount of conservation teaching remained slight in many of the Group II schools.*

From the data available on structural characteristics, then, it has been possible to construct general profiles of institutional types, based chiefly upon their geographical location and the size of their place of location. Once these factors were established, the remaining organizational characteristics followed distinct patterns of combination. These patterns could then be compared to similar configurations derived from data on the sample of mailed questionnaires.

### TEACHING PATTERNS

Turning from structural to functional characteristics of the Land-Grant and Other schools, it was necessary to diverge from the format used with the mailed questionnaire sample. The same kind of data could not be determined from a catalogue analysis as from material derived from individual administrative judgments. There-

fore, the conclusions with respect to teaching in the Land-Grant and Other schools were restricted to a categorization of courses according to their places within curricula.<sup>10</sup>

*Areas of Teaching.* Table 22 gives a comparison of Land-Grant and Other schools according to the fields in which conservation is taught. The various teaching departments have been combined into fields in the same manner as for Table 16. In Land-Grant schools, the teaching of conservation was less evenly distributed among a variety of fields than in Other schools, owing essentially to

TABLE 22  
FIELDS IN WHICH CONSERVATION IS TAUGHT, BY TYPE OF SCHOOL

Field Category	Percentage of Schools Teaching Conservation		
	All Schools	I Land-Grant	II Other
(A) Conservation	8	10	6
(B) Education	8	12	3
(C) Physical science	31	28	36
(D) Social science	34	32	36
(E) Geography	49	38	64
(F) Agricultural science	65	96	19
(G) Natural science	72	82	58
Total schools	(86)	(50)	(36)

a heavy concentration of courses in Agricultural Science and Natural Science within the Land-Grant schools. The greatest disparity between the two groups was found in Agricultural Science, which was of paramount importance in Land-Grant but of minor significance in Other. Geography was the highest field category in Other, but was a poor third in Land-Grant. In neither group was the highest category coincident with that for All Schools, a fact which accentuated the differences between the two groups.

Another way of showing the distribution of conservation teaching was to take the total number of courses in which the subject was taught and compute the proportionate representation of each field category within the total. In Table 23, the more even distribution of categories in Other and the extreme concentration of Land-Grant

<sup>10</sup> In examining catalogues all courses using the term "conservation" either as a part of the course title or in the description of the course content were classified as conservation courses. In addition certain other courses that obviously belong in the conservation group either because they deal with conservation processes per se, or because they are essential to the understanding of the nature of conservation itself, were included in the count. An illustration of the first is such a course as Game Management, and of the second, Animal Ecology.

TABLE 23

PERCENTAGE OF TOTAL CONSERVATION COURSES IN EACH TEACHING FIELD

Field Category	School Type		
	All Schools	I Land-Grant	II Other
(A) Education	2	2	0
(B) Social science	4	3	9
(C) Conservation	4	3	10
(D) Physical science	4	3	10
(E) Geography	7	3	19
(F) Natural science	25	23	32
(G) Agricultural science	54	63	20
Total	100	100	100
Number of courses	(967)	(757)	(210)

courses in Natural Science and Agricultural Science are similar to the findings of Table 22. However, the differences between the two tables in the rank order and the relative importance of the categories are marked. Disparities among high and low categories were much greater in terms of courses than in terms of schools. This was largely due to the predominance of Land-Grant over Other in number of courses taught. This was true particularly in Agricultural Science and, to a lesser extent, in Natural Science.

Table 24 shows clearly that the extent of treatment given to conservation teaching may vary considerably with the field of learning in which it is given. In Social Science, Geography, and Physical Science the number of courses showed little difference either within groups or between groups. In these fields there were

TABLE 24

AVERAGE NUMBER OF CONSERVATION COURSES OFFERED IN FIELDS WHERE SUBJECT IS TAUGHT

Field Category	School Type	
	I Land-Grant	II Other
(A) Social science	1.3	1.5
(B) Geography	1.3	1.7
(C) Physical science	1.7	1.6
(D) Education	3.0	0.0
(E) Natural science	4.2	3.2
(F) Conservation	4.8	10.0
(G) Agricultural science	10.0	6.7
All schools	15.1	5.8

rarely more than one or two courses dealing with conservation. In Natural Science the number of courses in the average curriculum rose sharply, but did not vary greatly between Land-Grant and Other. Although Conservation was high in both groups, the number of courses and schools involved was relatively small (see Tables 22 and 23) and the Conservation category might well have been expected to have a fairly extensive course representation in the schools that offered it. It was Agricultural Science, however, which accounted for the main difference between groups. It was true, especially in Land-Grant institutions, that wherever Agricultural Science appeared in a curriculum it had a large concentration of courses in conservation. Therefore, the high incidence of teaching and the high numerical superiority of courses in Agricultural Science really set the pattern for the Land-Grant institutions. Since very few Other schools offered work in Agricultural Science, its importance within the type pattern was much less. Thus, the marked disparity in course averages in the All Schools category was a direct reflection of *between-group variation in Agricultural Science*, since the differences in the other categories were comparatively slight.

As a final characteristic of course offerings, it was possible to determine the classification of students to whom such courses were available. This gave some indication of the range of potential enrollment in such courses.

Owing to the large proportion of courses in the Undetermined category, it was not feasible to construct an accurate table showing course offerings by teaching field at each academic level. The available data indicated that approximately one third to one half of all courses were offered to undergraduates only, while about a fourth to two fifths of courses in most fields were offered to both undergraduates and graduates. Less than a fifth of the courses in nearly all fields were offered to graduate students only. While there were some fairly sizable differences within individual teaching fields, the over-all differences between Land-Grant and Other schools were comparatively slight.

By way of summary on areas of teaching, we may note the following points:

1. In Land-Grant schools, conservation courses were taught more frequently in Agricultural Science and Natural Science than in other teaching fields, while in Other schools the highest incidence was found in Geography and Natural Science.

2. In Land-Grant schools, Agricultural Science was the leading field in total number of conservation courses taught, while in Other schools Natural Science was the leader.

3. Dividing the number of conservation courses taught in each field by the number of institutions in which some conservation was taught in the field showed Agricultural Science to be the leading field in average number of courses within the Land-Grant schools, while Conservation led in Other schools with Agricultural Science a fairly close second.

4. In both Land-Grant and Other schools, undergraduates were the major class of students to whom conservation courses were offered.

*Majors and Degrees.* To a limited extent, the number and kind of majors and degrees provided an index of conservation emphasis in an occupational sense. That is, the presence of a special conservation major or degree at a school would suggest that a student could, if he so desired, seek professional competence, and eventual employment, in the fields offered. A distinction would have to be made between undergraduate and graduate study, in that an undergraduate emphasis represents a potential rather than an actual professional status.

A tabulation of major fields was made on the basis of geographical areas so that any differences with respect to the special problems and interests of particular regions would emerge. Thirty schools, slightly over one third of those in the entire group, offered undergraduate curricula built around one or more fields of conservation. Of these schools, only two were not Land-Grant institutions. The Northcentral and Mountain regions had the largest and most diversified programs for majors. Both Northeast and Southeast regions were concentrated in the same field, namely, wildlife. Majors in wildlife conservation were most prevalent, both regionally and numerically, although there were none on the Pacific Coast. Certain regional specialties showed up, such as the Range major, which was confined to the Mountain and Pacific areas. The Northcentral group of schools averaged 1.7 undergraduate majors per school, and the Mountain area nearly 3 majors per school. All other regions had lower averages.

Most of these major curricula were technically oriented. In only 4 instances were social science or other electives required, while in 3 cases such electives were suggested. Thus it would appear that, in schools offering undergraduate majors in conservation, the tendency was to emphasize techniques and practical skills rather than a broad, generalized approach. This was substantiated by the fact that only 6 schools listed majors that could be classified under the heading of General Conservation. This emphasis upon the tech-

nical aspects of conservation is doubtless a reflection of the fact that the undergraduate major is offered as a part of specific occupational preparation.

The schools giving graduate work leading to advanced degrees were even more selective than those offering undergraduate majors. Only 10 schools gave advanced degrees in fields that came within the scope of this study.

Among these schools, 5 offered the master's degree in the field of wildlife, 2 offered the degree in fisheries and wildlife, 1 in fisheries, 1 in soil and water, and 4 in general conservation. Three schools offered the doctorate in wildlife, while 1 school offered this degree in fisheries and wildlife, 1 in fisheries, and 1 in general conservation.

Eight of the 10 schools were Land-Grant institutions, and both of the others gave their work in the field of General Conservation. Thus, as with undergraduate curricula, advanced academic training in conservation also seemed focused on the technical and physical aspects of the various fields, although 4 schools definitely considered competence in the broad aspects of the subject as worthy of professional degree status.

*Summary.* By examining the teaching patterns of the group of Land-Grant and Large Universities, it has become clear that differences exist between the Land-Grant and the Other institutions. Structural differences stem mainly from variations in geographic location, in the immediate environment (city size and characteristics) in which a school is located, and in its major source of support. The preponderance of Agricultural Science in the Land-Grant type and of Geography in the Other type as the chief vehicles of conservation teaching is evidence of marked differences in the area of teaching. This basic dissimilarity of approach to conservation is fundamental to the other curricular differences between the groups. The only variable for which differences were not consistent was the class of student to whom courses were offered.

Areas of emphasis, as signified by use of the word "conservation" in course titles or descriptions, confirmed the differences between school types determined from the data on teaching areas. Certain fields were more likely to emphasize conservation, regardless of the school in which they were taught, although these fields were more frequently found in Other schools than in the Land-Grant type. This suggests that the aspects of conservation taught may be different in the two types of schools. The Land-Grant institutions tend to lean toward a technical and occupational orientation, while the Other schools employ a generalizing or survey sort of approach.

These latter qualitative differences were borne out in the data on undergraduate majors and advanced degrees, where regional and type group differences were again apparent. There seems little doubt, therefore, that the teaching patterns of the two major group types of schools can be defined and compared in terms of at least a few structural and operational elements.

# 6

## SOME PERSONAL CHARACTERISTICS AND PROFESSIONAL ATTITUDES OF CONSERVATION TEACHERS

It is axiomatic that any survey of the status of conservation in the colleges and universities must include the teachers of conservation. Hence, the survey plans called for a body of information contributed by them. It appeared obvious, however, that the views of the institutional administrators and the activities and views of the classroom teachers could not be obtained by means of the same survey instrument. Consequently, the names of persons teaching conservation in the colleges and universities supplying information for the survey were obtained from questionnaires and institutional catalogues, and a special questionnaire was sent to each one (see the Appendix). The information supplied by this questionnaire was intended to throw light upon the following questions: "What are the conservation teacher's professional characteristics, and his attitudes toward the general problem of conserving natural resources? How does he view the problem of teaching conservation at the college level, particularly from the standpoint of making such teaching effective? What courses involving conservation does he teach, and how is the subject handled in these courses?"

Normally, a questionnaire long enough to cover these three questions thoroughly would not have been returned in sufficient numbers to be representative of the number of teachers contacted. This situation would have presented a considerable difficulty if it had not been for the interest exhibited by the teachers. As noted in Chapter 4, half of the 1,437 questionnaires were answered and returned. The teachers responding represented 70 per cent of the



colleges and universities teaching conservation as reported by the administrative questionnaires, the results of which are discussed in Chapter 5. Although some of the questionnaires were returned too late to be included in this analysis, the 43.5 per cent return upon which the following analysis is based was regarded as adequate after careful tests and comparisons with those arriving too late for tabulation.

In considering the contents of this chapter, it should be borne in mind that close comparisons between these findings and those reported in Chapter 5 are neither possible nor advisable for certain definite reasons. In the first place, not all the teachers of conservation located in the 566 schools that reported some conservation teaching answered the teacher questionnaire. In the second place, the questions put in the two questionnaires, i.e., the one to school administrators and the one to teachers of conservation, are not strictly comparable. In spite of that, the analysis presented in this chapter provides certain findings that closely parallel those based upon the administrative questionnaire, which were presented in Chapter 5. These parallels will be noted as they occur.

### *Teacher Distribution and Institutional Characteristics*

The organizational characteristics of the schools with which the teacher respondents were affiliated will now be examined according to the procedure previously used (see Chapter 5).

#### GEOGRAPHIC AREA

The distribution of teacher respondents by geographic area is shown in Table 25. As might have been expected, their distribution paralleled rather closely the distribution of the schools teaching conservation. Nearly three fourths of all teacher respondents were found in the Northcentral, Southeast, and Northeast areas. These populous areas contained 71 per cent of the teacher respondents, as compared with 74 per cent of the teaching schools. In none of the six geographic areas did the percentage of teacher respondents vary more than 3 per cent from the percentage of teaching schools. The Northcentral area contained 34 per cent of all teacher respondents, nearly twice as many as any other geographic area. It was the leader in every type of institution except Junior Colleges, where the Pacific area led by a slight margin, and Special Schools, in which the Northeast was the leader.

Distribution patterns of teacher respondents by geographic area varied considerably from one type of institution to another. The

TABLE 25  
DISTRIBUTION OF TEACHERS BY GEOGRAPHIC LOCATION OF SCHOOL

Location	Percentage of Teachers				
	All Teachers*	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Mountain	7	16	3	4	10
(B) Southcentral	10	9	14	5	6
(C) Pacific	12	8	10	4	32
(D) Northeast	18	15	13	35	11
(E) Southeast	19	23	23	10	11
(F) Northcentral	34	28	38	43	31
Total	100	100	100	100	100
Number of Teachers	(626)	(184)	(220)	(101)	(101)

\* Contains 20 teachers in Special Schools, not otherwise classified.

pattern for Four-year Colleges and Small Universities showed the most similarity to the All Teachers pattern. The distribution in the Land-Grant and Large Universities generally reflected the number of states in the respective geographic areas. Respondents affiliated with Teachers' Colleges were heavily concentrated in the Northcentral area and Northeast. The concentration of Junior College respondents in the Pacific and Northcentral areas reflected the extraordinary development of junior college education in these sections. Three fifths of the teacher respondents from Special Schools were found either in the Northeast (35 per cent) or Northcentral area (25 per cent). Thus it was evident that teachers in different types of schools were concentrated in different areas in a manner consonant with the distribution patterns of the schools themselves.

### MAJOR CURRICULUM<sup>1</sup>

Half of all teacher respondents were in schools with a Diversified curriculum and another 28 per cent were in institutions classed as Liberal Arts, or Arts and Sciences. Seventeen per cent were in schools with Education curricula and 3 per cent in schools with Specialized curricula (2 per cent were Undetermined). Sharp differences were manifest among the various groups of institutions. All teachers in Land-Grant and Large Universities were classed under Diversified and all those in Teachers' Colleges under Educa-

<sup>1</sup> The Size of Location Place variable was not computed for this sample.

tion. Eighty-five per cent of the teachers in Special Schools were from institutions with Specialized curricula. Those in Four-year Colleges and Small Universities and those in Junior Colleges were divided between Liberal Arts, Arts and Sciences (59 per cent and 41 per cent, respectively) and Diversified (33 per cent and 59 per cent, respectively). Only in the Four-year Colleges and Small Universities was Liberal Arts, Arts and Sciences the dominant curriculum category.

### RELIGIOUS AFFILIATION

Seventy-nine per cent of the teacher respondents were found to *be from schools with no religious affiliation*, 14 per cent were from Protestant-affiliated institutions, and 4 per cent were from Catholic-affiliated schools (3 per cent were classed as Other and Undetermined). In only one type of institution was there a sizable representation from religious-affiliated schools. This was in the Four-year Colleges and Small Universities, where 36 per cent of the teachers were in Protestant-affiliated schools and 9 per cent were in schools with a Catholic affiliation. The distribution pattern for teacher respondents was generally similar to that for teaching schools as presented in Chapter 5.

### MAJOR SOURCE OF FUNDS

Sixty-eight per cent of the teachers in the sample were in schools supported mainly from public sources. Nine tenths or more of the teachers in Land-Grant and Large Universities, Teachers' Colleges, and Special Schools were in publicly supported schools. In Junior Colleges 79 per cent were in publicly supported institutions. Only in the Four-year Colleges and Small Universities was the proportion reversed. Here 70 per cent of the teacher respondents were from privately supported schools—a figure almost precisely opposite to that for All Teachers. In general, the patterns of distribution for teacher respondents were similar to those for teaching schools as revealed in Chapter 5.

### STUDENT ENROLLMENT

Table 26 shows the distribution of teacher respondents according to school enrollment. It will be noted that nearly two thirds of the teachers were found in schools with enrollments of 900 or over. This represented a considerable divergence from the results of the administrative questionnaire, in which only a third of the schools responding were in the 900 or over class. The change was confined

TABLE 26  
DISTRIBUTION OF TEACHERS BY SCHOOL ENROLLMENT

Enrollment	Percentage of Teachers				
	All Teachers*	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) 500-899	16	1	25	25	14
(B) Under 500	20	—	24	20	52
(C) 900-2,499	28	11	30	50	29
(D) 2,500 and over	36	88	22	5	5
Total	100	100	100	100	100

\* Includes 20 teachers in Special Schools not otherwise classified.

almost entirely to the category 2,500 and over, which was more than three times as large in the teacher sample as in the school sample. The distribution of enrollment categories by type groups showed that the schools varied sharply in size. Land-Grant and Large Universities were almost exclusively in the category 2,500 and over. Teachers' Colleges were strongest in the category 900-2,499, while Junior Colleges were found chiefly in the Under 500 category. The Four-year Colleges and Small Universities had a fairly even representation in all enrollment categories.

### SEX OF STUDENT BODY

Ninety per cent of all teacher respondents were in Coeducational institutions, 5 per cent in Female, and 3 per cent in Male (2 per cent were Unspecified). The coeducational schools accounted for nine tenths or more of the respondents in all type groups except Four-year Colleges and Small Universities, where the percentages were Coeducational 81 per cent, Female 10 per cent, Male 7 per cent, and Unspecified 2 per cent. The coeducational schools represented a considerably higher percentage in the All Teacher sample than in the All School sample, where they amounted to 72 per cent of all teaching schools. The difference was due largely to the presence of the Land-Grant and Large Universities in the All Teacher sample, whereas this group was not present in the All School sample.

### SUMMARY

From the structural characteristics of the schools from which the sample of teachers was obtained, it appears evident that in most

respects the categories found to be dominant in the school samples were also of primary importance in the teacher sample. Thus, the question, "What kinds of schools are the conservation teachers most like to come from?" can be answered in much the same way as "What kinds of schools teach conservation?" The chief difference in the two answers is to be found in the concentration of teachers among the various institutions, a factor not explicit in the teaching and nonteaching dichotomy as determined from the results of the administrative questionnaire.

Unquestionably, the large number of teacher respondents in the large Land-Grant schools influenced the Column X profile of Table 27, since most of these schools were in the Northcentral area category. In fact, the Column X profile fits these particular schools exactly, and, with the exception of the Areas of Location variable, the profile would fit most of the Land-Grant schools in all areas.

TABLE 27  
DISCRIMINATORY SCHOOL CATEGORIES WITH RESPECT TO CONCENTRATION OF  
CONSERVATION TEACHERS

Variable	Column X Categories for Many Teachers	Column Y Categories for Few Teachers
1. Area of location	Northcentral	Western
2. Major curriculum	Diversified	Specialized
3. Religious affiliation	None	Catholic
4. Major source of funds	Public	Private
5. Enrollment	2,500 and Over	500-899
6. Sex of student body	Coeducational	Male, Female

A review of the variables by types shows that the Four-Year Colleges and Small Universities were most likely to vary from the All Teacher average, either by modifying the emphasis among the categories or by reversing the pattern entirely. Thus, if school differences themselves bear any relation to teacher attitudes and opinions, they would be revealed when those attitudes and opinions were compared. This relationship will be examined in later sections of this chapter.

### *Teacher Attitudes and Opinions on Conservation<sup>2</sup>*

This section summarizes some of the views of the teacher respondents with respect to conservation, both as a field of knowledge

<sup>2</sup> As there were only twenty respondents (about 3.1 per cent of the total sample) in the Special School group, this group was dropped as a special entity in the analysis. However, in every instance these respondents were included in the All School distribution.

and as a social and economic factor in American life and education. Data for the section were derived from the first half of the teacher questionnaire (see Appendix, Questions 3-12).

### HIGHEST DEGREE HELD

It was felt that the academic training of conservation teachers would probably be of some importance in shaping their attitudes and opinions regarding the subject. Teachers indicated on the questionnaire the highest degree held at the time of response, although many pointed out that they were working toward higher degrees. Fifty-two per cent of all teachers responding to the questionnaire held the doctorate, while 41 per cent had attained the master's degree, and 4.5 per cent possessed the bachelor's degree only (2.5 per cent were classed as Other and Unspecified). Differences between the All Teacher distribution and the type group distributions were pronounced. Teachers holding the doctorate were dominant in two groups, the Land-Grant and Large Universities (66 per cent) and the Four-year Colleges and Small Universities (59 per cent). Nearly all the remaining teachers in these type groups held the master's degree. In the Teachers' Colleges the respondents were equally divided between those with the doctorate and those with master's degrees (47 per cent in each category). In Junior Colleges 72 per cent of all teachers possessed the master's, the remaining teachers being divided about equally between those with the doctorate and those with the bachelor's degree. Whether or not these distributions reflected the composition of faculties as a whole within the several school types, so far as degree status was concerned, they probably may be regarded as a fair representation of the degree status of the conservation-teaching faculty.

### FIELD OF TEACHING

The department or division in which a conservation teacher offered his courses would be expected to correspond with the main curriculum emphases among the type groups of schools as revealed by the administrative questionnaire (Chapter 5). Such a correspondence proved to exist, with the exception of certain discrepancies that will be noted.

As shown in Table 28, two teaching fields, Natural Science and Agriculture, accounted for two thirds of all teachers in the sample. The third field, Geography, had slightly more than a tenth of the teachers, while Social Science and Physical Science each accounted

TABLE 28  
DISTRIBUTION OF TEACHERS BY TEACHING FIELDS

Teaching Field	Percentage of Teachers				
	All Teachers*	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Conservation	2	5	0	1	0
(B) Education	4	3	5	2	4
(C) Physical science	8	6	13	1	8
(D) Social science	9	6	10	11	13
(E) Geography	11	10	13	24	2
(F) Agriculture	24	43	11	8	21
(G) Natural science	42	27	48	53	52
Total	100	100	100	100	100

\* Includes 20 teachers in Special Schools, not otherwise classified.

for slightly less than a tenth. Education and Conservation accounted for 4 per cent and 2 per cent respectively.

The profiles by groups showed that considerable differences existed from one group to the next. As expected from the results of the administrative questionnaire, the Land-Grant and Large Universities showed the largest number of teachers in Agriculture. In the remaining type groups Agriculture was below the All Teachers average, although it was fairly strong in the Junior Colleges. Natural Science was the leading field in all type groups except the Land-Grant group, accounting for about half of all teachers in each of the other groups. The Teachers' Colleges showed expected strength in Geography, Junior Colleges in Social Science, and the Four-year Colleges and Small Universities in Physical Science.

The differences in group profiles meant that several categories were bound to have a wide range of teacher distribution. This was particularly evident in Natural Science, Agriculture, and Geography, where most of the teacher sample was concentrated. These findings were generally consistent with the results of the analysis of schools, as was, for example, the high incidence of Geography in the Teachers' Colleges. However, there were some apparent discrepancies, such as the relatively high rank of Physical Science displayed by the school analysis, and its low position among the teachers reporting. This may have been due to lack of response from Physical Science teachers. But whatever the proper explana-

tion may be, the representation of Physical Science in the teacher sample does not seem commensurate with the importance ascribed by administrators to Physical Science as a teaching field.

### INTEREST IN CONSERVATION

The first teacher variable involving personal rather than situational characteristics was extent of interest in conservation itself.

Strong interest in conservation was professed by 70 per cent of all teachers responding to the teacher questionnaire. Moderate interest was expressed by 28 per cent and Slight interest by 2 per cent. In only one group of institutions did the percentage of teachers indicating Strong interest exceed the All Teacher average. This was in the Teachers' College group, where Strong interest was expressed by 79 per cent of the respondents. Percentages for the remaining groups were: Four-year Colleges and Small Universities, 68 per cent; Junior Colleges, 65 per cent; Land-Grant and Large Universities, 64 per cent. Thus in the Teachers' Colleges nearly four out of five teachers indicated Strong interest, while only about two out of three did so in the other groups. It is noteworthy that the Land-Grant group, which had the largest number of conservation courses, contained the smallest proportion of teachers evincing strong interest in the subject. In no group did the proportion indicating only Slight interest exceed 4 per cent.

When the religious affiliation of the school was considered, it was found that, the expressions of Strong interest by teachers in Protestant Schools and by teachers in nonaffiliated schools were apparently not significantly different. Seventy-four per cent and 70 per cent of the latter expressed Strong interest in conservation. However, of teachers in Catholic schools, only 52 per cent, a markedly smaller figure, expressed Strong interest in conservation.

Variations among teachers with respect to their interest in conservation were also related to the respective subject-matter departments in which these teachers functioned. Teachers functioning in the fields of conservation and of geography professed the strongest interest, while teachers of social science and of physical science professed the least interest. Teachers functioning in the Land-Grant institutions, a considerable proportion of whom were agriculture teachers, reported an interest near the mean of all teachers in the sample. See Figure 1.

Teachers' interest did not appear to be related to size of school measured in terms of student enrollment.



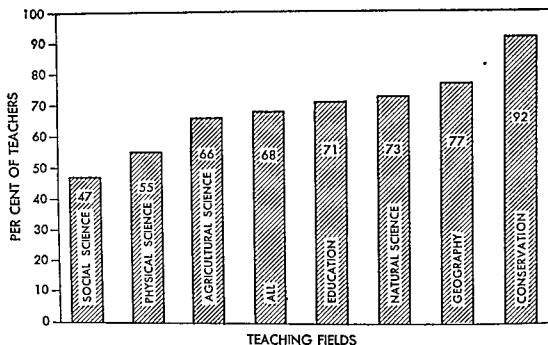


FIGURE 1. Percentage of teachers expressing strong interest in conservation, by teaching field.

### DEFINITION OF CONSERVATION

In the teacher questionnaire, teachers were asked, "What is your conception, or definition, of conservation as applied to natural resources?" (Appendix, Question 7). Since this was presented as a "free answer" question, it was more difficult to categorize the replies than when working with variables having more structured responses. It was necessary to examine the entire range of definitions to extract major themes around which the individual answers could be grouped. Sometimes an answer included more than one theme, in which case the selection of the predominant one became a matter for the investigator's judgment. However, despite some inevitable looseness of interpretation, the five categories listed in Table 29 seem to encompass the definitions given by the conservation teachers.

By way of explaining the categories used in Table 29, it may be said that the focus of Planned Use was upon some sort of institutionalized control over resources, principally in the form of regulation or allocation by governmental agencies.

Preservation and Frugality centered upon preservation of existing resources in the sense of using as little as possible, regardless of other factors. The "saving" of resources was considered something of a virtue in itself. This category contained most of the moralistic definitions.

TABLE 29  
DISTRIBUTION OF TEACHERS BY DEFINITION OF CONSERVATION

Definition Given	Percentage of Teachers				
	All Teachers*	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Planned use (controls)	8	8	10	8	8
(B) Preservation and frugality of use	9	11	9	7	12
(C) Economic efficiency	11	12	12	5	7
(D) Avoidance of waste; replenishment	18	18	16	12	25
(E) Wise use	43	40	37	63	44
(F) Other, and not specified	11	11	16	5	9
Total	100	100	100	100	100

\* Includes 20 teachers in Special Schools, not otherwise classified.

Economic Efficiency used classic economic criteria, such as future supplies of raw materials, potential consumer demand, and productive efficiency, as the basis of determining resource use. Conservation was conceived as a function of the cost-price structure whereby the most economic producers would practice the most conservation. Thus, conservation was more of a by-product of good management than an objective in itself.

Avoidance of Waste; Replenishment placed great stress upon the replenishment of renewable resources as a corollary to their consumption, while emphasizing that nonrenewable resources would have to be used sparingly. A feature of this category was that it made the distinction between the two classes of resources and prescribed different treatment for each. Renewable resources were considered as a kind of "crop" that could and should be harvested, but only on condition that replacement or renewal occurred to insure a continuous supply.

Wise Use carried the least specific meaning. Some respondents elaborated the term to include such precepts as "greatest good for the greatest number of people" or "greatest good for the longest time," or a combination of these. But a majority simply mentioned Wise Use without any qualifying statements. A number of teachers stated that they had learned this concept from textbooks dealing with conservation.

Although Wise Use dominated the entire distribution, it was especially emphasized in the Teachers' College group, where nearly two thirds of all teachers gave a definition of this sort. The lesser categories appeared fairly stable from group to group, even though rank order varied considerably within groups. Checking distribution of definitions by school enrollment, school religious affiliation, and school location failed to reveal consequential differences based upon these variables. A comparison by major source of school funds showed that Wise Use was mentioned by 49 per cent of respondents in publicly supported schools, and by 31 per cent of respondents in those privately supported. Differences by source of funds were small for other definition categories, and were well distributed. Thus, teachers in privately supported schools appeared to be a bit more specific when defining conservation than teachers in those publicly supported.

#### EXPANSION OF THE ECONOMY

When queried as to the possibility of further expansion in the American economy, 36 per cent were of the opinion that the economy would continue to expand indefinitely, while another 15 per cent thought it would expand for at least 100 or 200 years. Thus, about half of all teachers in the sample expressed definite optimism, with most of these seeing no limit to economic expansion. Fourteen per cent felt that the limits of expansion would be reached in 50 years or less. Only 5 per cent believed that the limits had been reached already. Fourteen per cent indicated that they did not know or had no opinion, while 16 per cent gave some opinion other than the stated choices or made no answer at all. There was very little variation in percentages by type groups except for the teachers in Four-year Colleges and Small Universities, who showed somewhat more uncertainty and less tendency to high optimism than the other groups. Even among these teachers, however, 46 per cent answered either Indefinitely or 100-200 Years. No other tested variables showed distinctive trends or patterns on this opinion factor.

#### CONSERVATION HABITS OF THE AMERICAN PEOPLE

The teachers were asked to characterize the habits and customs of the American people with respect to resource use. Analysis of the replies showed that the teachers generally do not approve the manner in which the American people have handled their natural resources up to the present time. More than three fourths of the

respondents believed the public has been Unnecessarily wasteful or indifferent toward economic use, while only 1 per cent thought Americans were Most Economical, considering the circumstances. Slightly less than a fifth believed the public to be Moderately Economical. There was some variation in emphasis among the type groups. Respondents in Teachers' Colleges and Junior Colleges were fairly close to the All Teachers profile. The Land-Grant and Large University group was the least inclined toward censure (69 per cent believed the public to be Unnecessarily wasteful or indifferent), while the Four-year Colleges and Small Universities had the largest proportion expressing such a view (84 per cent). See Figure 2.

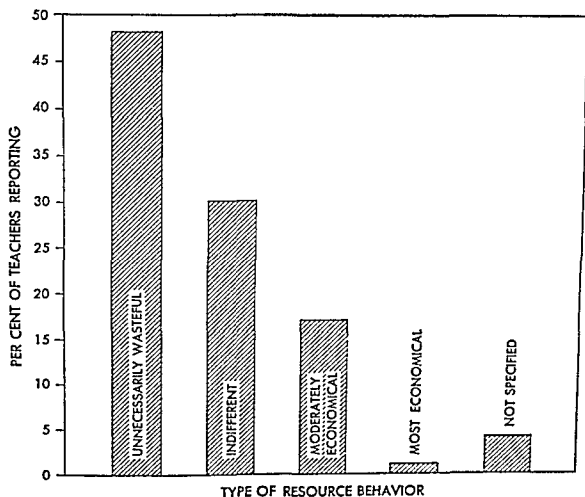


FIGURE 2. Resource behavior attributed to the American people by teachers of conservation.

### RESOURCE OUTLOOK

As a corollary to their historical viewpoint, the teachers were requested to state their opinion of the adequacy of future resource supplies. Analysis of the results revealed that only 11 per cent

of the teachers anticipated no important crises in the supply of resources. Serious shortages were anticipated by 27 per cent, while 55 per cent felt that shortages would arise, but that substitutes would eventually be found to relieve the situation. The remaining 7 per cent gave other answers, or none. The high percentage of teachers anticipating "temporary shortages until adequate substitutes can be found" seemed to indicate that they were aware of the high rate of current consumption of resource materials, but that they had faith in the ability of technology and the mental resources of the people to offset any important deficiencies.

The type groups showed the same rank order of percentages, but the emphasis differed from group to group. The Teachers' College group appeared the most concerned about serious shortages. Of these teachers, 34 per cent expected Serious Shortages while only 6 per cent foresaw No Serious Shortages. At the opposite extreme were teachers in Junior Colleges and Land-Grant and Large Universities. Only 8 per cent of Junior College teachers answered No Serious Shortages, but only 18 per cent actually anticipated such shortages. About two thirds indicated Temporary Shortages—considerably the highest proportion of any type group. Of the Land-Grant and Large University teachers, 18 per cent answered No Serious Shortages and 23 per cent Serious Shortages. Thus there was definite variation among groups in the polar categories of the scale, even though the majority of teachers, regardless of school type, were in the intermediate Temporary Shortages category (5 to 9 per cent by type group gave other answers or no answer to the question).

Using school enrollment as a stratifying variable, it was found that there was virtually no difference as far as Serious Shortages were concerned, but that teachers in schools enrolling 2,500 or more students were more likely to indicate No Serious Shortages.

Using school religious affiliation as the variable, the results showed that, slightly more than half of the teachers in all categories believed that only Temporary Shortages lie ahead. However, the teachers in Protestant-affiliated schools were definitely more pessimistic in outlook than those in other schools. Teachers in Catholic-affiliated schools were most optimistic, with teachers in schools without religious affiliation taking a middle ground. See Figure 3.

On none of the other structural variables did differences in resource outlook seem marked.

In summary, it appears that the teachers in the Land-Grant and Large University group were the least likely to condemn past re-

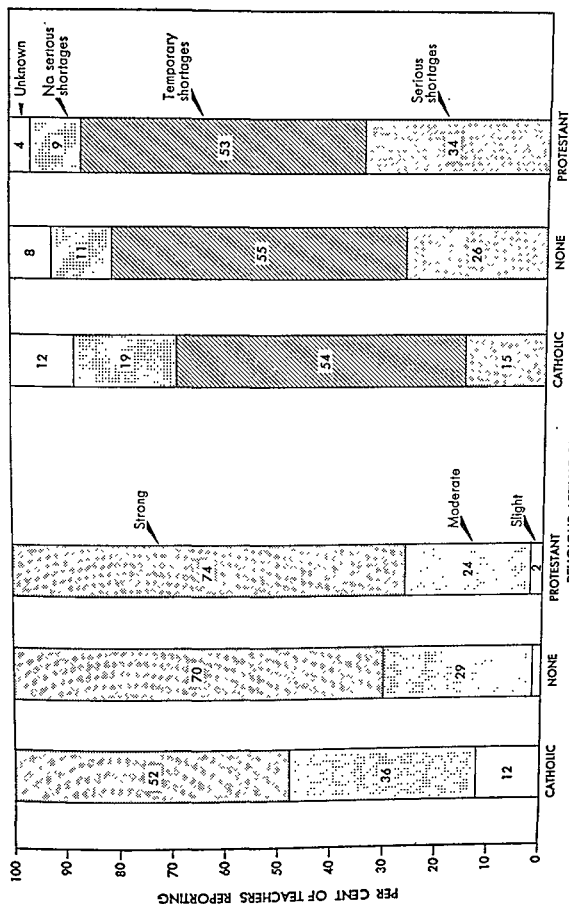


FIGURE 3. Teacher interest in conservation and outlook for resource supply.

source use practices and least likely to anticipate serious resource shortages in the future. On the other hand, those in Four-year Colleges and Small Universities and in Teachers' Colleges were more inclined to censure past behavior and to be most pessimistic in their view of the future. As to future outlook, the most pessimistic of all appeared to be the teachers in Protestant-affiliated Four-year Colleges and Small Universities.

### REASONS FOR CONSERVATION'S LACK OF POPULARITY

Question 11 of the questionnaire called for an explanation of the lack of popularity of conservation in the United States (see the Appendix). Respondents were permitted to check as many of the six postulated reasons as they wished, and to add additional ones. Most of them checked two or more reasons. The results are shown in Table 30.

TABLE 30  
REASONS FOR CONSERVATION'S LACK OF POPULARITY

Reasons Given	Percentage of Teachers Mentioning*				
	All Teachers†	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Belief conservation will be practiced when necessary	23	28	24	21	16
(B) Belief science will "save us"	44	40	41	59	38
(C) Pressures from industry to consume and discard	44	46	44	48	41
(D) Feeling of irresponsibility	46	36	50	50	48
(E) Carryover of destructive attitudes of the past	46	40	46	59	41
(F) Ignorance of rate of resource use	62	57	65	60	60

\* Teachers were permitted more than one reason.

† Includes 20 teachers in Special Schools, not otherwise classified.

"Ignorance of the rate at which resources are being exhausted" was the factor most frequently mentioned, while "Belief that we will practice conservation 'when it becomes really necessary'" was mentioned least. Apparently the majority of teachers believed that

ignorance, rather than any combination of social or cultural characteristics, was largely responsible for conservation's lack of popularity. Only in the Teachers' College group were such categories as "Belief that 'science will save us'" and "Persistence of attitudes and habits formed during pioneer abundance" mentioned as frequently as "Ignorance of the rate at which resources are being exhausted." As a whole, the Land-Grant and Large University teachers, who were least willing to place personal responsibility for lack of conservation upon the public, were also least willing to admit that a history of destructive attitudes was instrumental in keeping conservation measures from being adopted. Only 12 teachers disagreed with the assumption that conservation measures are unpopular in the United States.

### HOW TO MAKE CONSERVATION EFFECTIVE

Continuing the assumption that conservation has not been popular in the United States,<sup>3</sup> the teachers were asked how, in their opinion, the principles of conservation could be made more effective in a free society. Again, certain possible means were suggested with opportunity provided for additional choices to be inserted. The returns showed strong preference for the educational approach, as might have been anticipated. Nearly three out of four (71 per cent) favored making the principles of conservation "Part of the personal beliefs and habits of every individual." Apparently it was not deemed sufficient that conservation principles become "Information familiar to all the people," as this response received only 40 per cent of all mentions. Even smaller emphasis was given to the remaining possibilities suggested in the questionnaire. Twenty-eight per cent of all mentions expressed the idea that the principles of conservation must be "Agreed upon and accepted by all groups working with natural resources" while the idea that such principles must become "An integral part of the law of the land" received only 24 per cent of all mentions.

Thus a substantial majority of the teachers appeared to feel that conservation cannot be made effective simply by "Presenting the facts." In their opinion conservation ideas will have to be inculcated into each person's behavior patterns in purposive fashion. Governmental action was not favored as a method of gaining individual conformity to conservation measures. The general feeling among teachers appeared to be that while conservation appears to be necessary, it cannot be forced upon the people.

<sup>3</sup> Charles E. Lively, "Some Reflections on the Conservation Movement," *Transactions of the Eighteenth North American Wildlife Conference*, 1953, pp. 36-46.



## SUMMARY

In summarizing the characteristics of conservation teachers with respect to the type of academic environment in which they worked and the attitudes they held concerning the subject of conservation, a composite picture of the "most prevalent" categories proved useful (see Table 31).

TABLE 31  
SOME DOMINANT CHARACTERISTICS OF THE TOTAL SAMPLE OF  
CONSERVATION TEACHERS

Variable	Dominant Category (Percentage of sample)*
1. Highest degree held	Doctorate (52)
2. Field of teaching	Natural science (42)
3. Interest in conservation	Strong (69)
4. Definition of conservation	Wise use (43)
5. Expansibility of the American economy	Indefinitely (36)
6. Past use of American resources	Unnecessarily wasteful (47)
7. Future resource supply	Temporary shortages, until substitutes are found (55)
8. Why conservation is unpopular in the United States	Ignorance of rate of use (62)
9. How to make conservation really effective in a free society	Make it part of personal habits and beliefs (71)

\* Percentages based upon one answer per question, except for Variables 8 and 9, which allowed more than one selection by respondents.

The constructed type of "modal teacher" set forth in Table 31 would seem to be a person with high academic training, working in a field which has produced many leaders of the conservation movement. However, while he claimed a high interest in conservation, his conception of it as a subject seemed vague and rather unenlightening. This modal teacher exhibited a strong faith in the future of the economy, and a reliance upon human ingenuity to compensate for large demands upon natural resource supplies. At the same time, he characterized American society as wasteful in resource use practices and ignorant of the excessive rate of consumption. In spite of his censure of national attitudes, he seemed optimistic that resource handicaps would be overcome by indoctrinating every person with the principles of conservation, so that conservation practices become a part of his personal habits and beliefs. The means by which the teacher thought this end might be accomplished were not determined.

Obviously this modal typology does not tell the whole story of teacher attitudes and beliefs. There were significant variations

among type groups of teachers, not so much in the rank order of categories for a particular variable as in the relative proportion of responses falling into the respective categories. In other words, the differences among type groups were essentially differences of degree rather than differences in kind—a tendency present in many of the teacher comparisons made in this study. In the following paragraphs each type group is briefly categorized according to the variables presented in Table 31.

The Land-Grant and Large University group of teachers had more than the average number of doctoral degrees and were concentrated in the fields of Agriculture and Natural Science. Their interest in conservation was slightly less than average and their position on Variables 5 and 7 (which might be called the "optimism" variables) was somewhat higher than for other groups of teachers. They were also the least likely to condemn past resource habits of the nation.

Teachers in Four-year Colleges and Small Universities were close to the sample average in the possession of degrees and in fields of teaching, although there were fewer than average in the field of Geography. Conservation interest was about average, while the optimism variables were below average. There was more than average inclination to condemn resource practices of the past.

The Teachers' College group had fewer doctor's degrees than average, but the high proportion of teachers in the field of Geography was reflected in a stronger than average interest in conservation. They were heavily committed to the Wise Use definition of the subject, which is standard in many conservation textbooks. On the optimism variables they were average (Variable 5) or below (Variable 7), and were average in their judgment of past resource habits. These teachers seemed more interested than any other group in the reasons for the unpopularity of conservation and the measures needed to remedy the situation.

The Junior College group differed most from the others in the scarcity of doctor's degrees. However, they were close to the mean in distribution by teaching fields, in conservation interest, and in their definition of the subject. They were average (Variable 5) or well above average (Variable 7) with respect to the optimism variables, and were close to the mean in their opinions regarding past resource practices.

Thus it may be seen that while the type groups of teachers were, in an absolute sense, more alike than different in their views concerning many of the general conservation variables, there were

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Thus it may be seen that while the type groups of teachers were, in an absolute sense, more alike than different in their views concerning many of the general conservation variables, there were

substantial differences in degrees of emphasis from one group to another.

As far as relationships among categories were concerned, it might be said that the field of teaching had a closer relationship to attitudes and opinions than did other situational factors. For example, strength in Geography as a teaching field seemed to raise the level of interest in conservation. Furthermore, the two groups with the strongest interest exhibited the least optimism about the future of the economy and resource supplies. It might be suggested, then, that the more interest a teacher expressed in conservation, particularly if he were in the field of Geography or Natural Science, the more critical and pessimistic he would probably be concerning the solution of resource problems. This configuration was stronger in Protestant schools and weaker in Catholic schools than in schools with no religious affiliation. Teachers showing a high degree of concern about the conservation situation were in a minority throughout the whole sample. The most optimistic points of view were held by teachers in the Land-Grant and Junior College groups, where a large proportion of the respondents were working in the field of Agriculture. Here again it must be noted that the differences indicated were a matter of degree of emphasis rather than reversals in the importance of categories.

### *Teacher Attitudes and Opinions Regarding Conservation Teaching*

In this section the teachers of conservation are categorized and compared with respect to their views concerning teaching fields, principles, and methods. In addition, certain comparisons are presented between general teacher attitudes toward conservation as reported in "Teacher Attitudes and Opinions on Conservation," this chapter, and pedagogic attitudes, which are the focus here. Data for this section were drawn from the answers to Questions 13-21 of the teacher questionnaire (see the Appendix).

### THE RELATIVE IMPORTANCE OF DIFFERENT FIELDS OF KNOWLEDGE TO CONSERVATION TEACHING

Teachers were asked to designate the subject matter, or fields of learning, they considered most important from the standpoint of teaching conservation of natural resources. In every type group a higher proportion of teachers mentioned Natural Science than any other field of knowledge. This general result might have been anticipated, since a much larger proportion of the respondents were

found to be in Natural Science than in any other teaching field, except in the Land-Grant group, where Agriculture claimed the largest number. However, in other respects there was a low degree of correspondence between Table 28, which shows the distribution of teachers by teaching fields, and Table 32, which deals with the importance of fields of knowledge to conservation teaching. Al-

TABLE 32  
IMPORTANCE OF FIELDS OF KNOWLEDGE FOR CONSERVATION TEACHING

Fields of Knowledge	Percentage of Teachers Mentioning				
	All Teachers	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Education	2	1	2	2	2
(B) All fields	8	7	6	12	8
(C) Geography	15	10	18	28	8
(D) Physical science	21	19	23	32	11
(E) Agricultural science	23	22	20	28	27
(F) Social science	25	30	25	32	11
(G) Natural science	43	39	46	49	43
Number of teachers	626*	184	220	101	101

\* Contains 20 teachers in Special Schools, not otherwise classified.

though teaching fields and fields of knowledge were not synonymous, they were deemed sufficiently close in meaning to afford a basis for comparison. In Table 28 the ranking of teaching fields from highest to lowest for all teachers was Natural Science-Agriculture-Geography-Social Science-Physical Science-Education-Conservation. In Table 32 the corresponding ranking for fields of knowledge deemed important in conservation teaching was Natural Science-Social Science-Agricultural Science-Physical Science-Geography-Education. Comparable discrepancies between the respective rankings were found for each type group with the exception of Junior Colleges, where the order of rank for Fields of Knowledge corresponded closely to that for Teaching Fields. Hence, the distribution of teachers by teaching fields (Table 28) was not closely related to their distribution by importance of fields of knowledge for conservation teaching.

As shown in Table 32, individual type groups diverged most notably from the sample mean in the following instances. (1) In the Four-year Colleges and Small Universities, the positions of

Physical Science and Agricultural Science were reversed, with the former ranking third and the latter fourth. (2) In the Teachers' Colleges, Geography was mentioned by a substantially higher proportion of teachers than in any other type group. (3) In the Junior Colleges, Agricultural Science ranked second, being mentioned by more than twice as many teachers as Social Science or Physical Science, which were tied for third place.

The percentage of teachers mentioning each field of knowledge on the list was highest in the Teachers' College group except in the case of Education, which was mentioned by 2 per cent of the teachers in every type group (except the Land-Grant, where it was mentioned by only 1 per cent). Junior College teachers were above the sample mean in only one field, Agricultural Science, and were much lower than the other fields in percentage mentioning Social Science and Physical Science.

Among the expected findings in comparing teaching fields with fields of knowledge considered important were the high position of Geography in Teachers' Colleges, the high position of Natural Science in all groups, and the high rank of Agriculture in Junior Colleges. Among the unanticipated findings in the comparison were the changed position of Agriculture in the Land-Grant, Social Science in the Junior College, and Physical Science in the Teachers' College groups.

### THE CONTRIBUTION OF SOCIAL SCIENCE TO CONSERVATION TEACHING

Since many teachers were presumably technique-oriented in their approach to conservation, their conceptions of the role of the social sciences in conservation education might be expected to vary from those held by teachers who were not so oriented.

In the teacher questionnaire, teachers were asked to register their opinions with respect to the role of Social Science in conservation education (see the Appendix, Question 14). When asked the question "Do you believe that the Social Sciences (e.g., anthropology, sociology, and economics) can make an essential contribution to conservation education?" 88 per cent of the teachers responded "Yes" while only 5 per cent replied "No." This overwhelmingly favorable response was shared about equally by all the type groups, with teachers in Four-year Colleges and Small Universities being slightly less favorable than the other groups (85 per cent in this group said "Yes" as opposed to 90 per cent in each of the other groups). These results were generally in keeping with the high

ranking previously indicated for Social Science as a field of importance in conservation teaching (Table 32). The principal discrepancy occurred in the case of the Junior College group, where 90 per cent of the teachers answered "Yes" when asked whether Social Science had a contribution to make, despite the fact that an exceptionally low percentage had mentioned Social Science under Fields of Importance. Evidently the Junior College teachers felt that Social Science had a contribution to make, but not one of great importance.

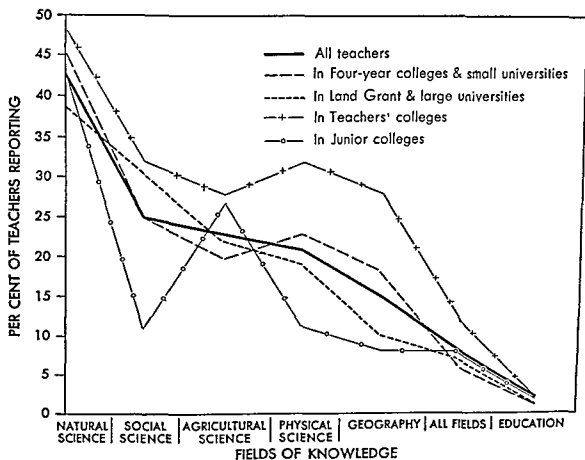


FIGURE 4. Teacher ranking of fields of knowledge for emphasis in conservation teaching.

Teachers indicating a belief that Social Science had a contribution to make to conservation teaching were asked further to specify what that contribution might be. Since this was a free-response question, it was necessary to form categories from the data. The results are presented in Table 33. It is worth noting that nearly one third of all the teachers did not answer this question. This was in sharp contrast to the small percentage failing to answer either "Yes" or "No" when asked simply whether they felt Social Science had a contribution to make. It would seem to indicate that while



## THE SURVEY AND ITS FINDINGS

TABLE 33  
MAJOR CONTRIBUTIONS OF SOCIAL SCIENCE

Contributions Mentioned	Percentage of Teachers Mentioning				
	All Teachers*	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Determining goals and attitudes	7	8	4	8	9
(B) Show man's relation to environment (ecology)	9	11	10	5	6
(C) Give human aspects of conservation	11	16	10	8	6
(D) Show consequences of lack of conservation (historical)	12	8	10	16	19
(E) Provide basis for action	12	9	13	12	9
(F) Show economic value of conservation	15	20	14	15	10
No answer					
Not specified	29	24	34	33	36
Number of teachers	(626)	(184)	(220)	(101)	(101)

\* Contains 20 teachers in Special Schools, not otherwise classified.

many teachers approved of Social Science in principle, they were not clear as to its content and its possible function in specific programs of conservation education.

The answers from those who replied fell into six main categories, according to type of contribution. Most frequently mentioned was the Economic contribution; in other words, that Social Science could contribute best by showing the economic value of conservation to individuals and to society. Doubtless this reflects the general tendency in American society to calculate the economic value of every kind of activity, so that close attention to the economic aspects of conservation would be considered right and proper.

Ranking next in frequency of mention were Political and Historical contributions. Teachers listing these felt that Social Science could provide a basis for action to institute better conservation practices and could show the historical consequences of a lack of conservation. One might suppose that the high ranking of the Historical contribution stemmed from a desire not to have history

repeat itself; i.e., a feeling that by tracing the wastes and follies ascribed to the past, man could profit by his mistakes. Apparently the Action category was regarded largely as an avenue for motivating people to take the necessary steps to conserve resources; in this case Social Science would serve as a stimulus rather than as an integral part of conservation itself.

Somewhat smaller numbers of teachers felt that Social Science could contribute by giving the human (Sociological) aspects of conservation or by showing man's relation to his environment, the Ecological contribution. Least mentioned among the six categories was the contribution of Social Science in determining conservation goals and attitudes.

Considerable differences were found to exist among the respective type groups. Teachers in the Land-Grant and Large University group laid greatest stress on Economic and Sociological contributions. Those in the Four-year Colleges and Small Universities showed a rather even distribution of categories, relatively close to the sample mean. The Teachers' College group stressed Historical and Economic contributions. Junior College teachers stressed Historical contributions more and Economic contributions less than did any other group.

When the questionnaire results were tabulated in terms of other variables, it was found that teachers in smaller schools stressed the Historical contributions of Social Science, while those in larger schools favored the Economic contributions. This difference seemed due largely to the large representation of Junior College teachers in the small school group, as contrasted with the heavy representation of Land-Grant and Large University teachers in the large school group. Likewise, the teachers in publicly supported schools were twice as strong for an Economic emphasis as were teachers in privately supported schools.

Only about one fifth of the teachers in the sample came from schools having a religious affiliation. This was not because these teachers responded poorly, but because the nonaffiliated category included most of the large schools, which had more extensive curricula and consequently more teachers, so that it was much more heavily represented in the teacher sample than it was in the school sample. Teachers in schools with no religious affiliation were close to the sample mean in all categories except the Economic one, mentioned by 18 per cent of the nonaffiliated teachers as opposed to 15 per cent of All Teachers. The teachers in both Protestant and Catholic categories ranked the Economic type of contribution fairly low (mentioned by 9 per cent and 4 per cent, respectively), while

giving primary emphasis to the Action category (mentioned by 18 per cent and 20 per cent, respectively). The Historical type of contribution ranked second among teachers in the Protestant group (14 per cent mentioned it), but ranked last among teachers in the Catholic group (none mentioned it). The Sociological type of contribution ranked second among teachers in the Catholic category, being mentioned by 16 per cent, as opposed to 10 per cent in the Protestant group, where it ranked third. The Catholic group gave considerable support to the idea that Social Science could contribute to the determination of conservation goals and attitudes (12 per cent mentioned it), whereas the idea had very little support in the Protestant group (only 2 per cent mentioned it). The Ecological type of contribution was mentioned by 8 per cent in the Protestant category, as opposed to 4 per cent in the Catholic group. On the whole there seemed little doubt that Social Science was thought of more in terms of inspirational and moral contributions by teachers in schools with a religious affiliation, while materialistic and self-interest values were stressed more by teachers in non-affiliated schools. It should be noted that 44 percent of the teachers in the Catholic group and 39 per cent in the Protestant group gave no answer to the question. In each case the percentage failing to answer was substantially higher than the mean for All Teachers (29 per cent).

#### DEFINITION OF A GENERALIST

Within recent years, a distinction has been growing up between conservationists who are interested in, or who have attained professional skill in a particular method or field of practice, and those persons who view the subject in terms of its broad implications and in relation to other types of human activity. For want of better names, these two kinds of persons have been designated as Specialists and Generalists. Since the description and function of the Generalist is harder to pinpoint, the teachers were asked to define the Generalist in a functional manner (i.e., in terms of his areas of interest and activity. See Appendix, Question 15). It was especially desired to know whether the Generalist functioning in the area of conservation was conceived as belonging to or carrying on his work in a particular academic field or operational environment.

Table 34 indicates that the Generalist was associated most frequently with the economic, sociological, and educational aspects of the conservation field. To a lesser extent he was thought of as

TABLE 34  
TEACHER DEFINITIONS OF THE GENERALIST IN CONSERVATION

Definitions Mentioned	Percentage* of Teachers Mentioning				
	All Teachers†	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Co-ordination, skills, and techniques	19	18	20	25	13
(B) Scientific theories and concepts	20	20	22	23	14
(C) Conservation policies and administration	38	40	35	47	33
(D) Current and historical information	38	32	43	41	41
(E) Economic, sociological, and educational aspects	54	48	54	66	52
(F) Other	10	13	10	8	5
(G) Don't know, not specified	18	19	15	18	18
Number of teachers	(626)	(184)	(220)	(101)	(101)

\* Respondents were permitted more than one answer.

† Contains 20 teachers in Special Schools, not otherwise classified.

concerning himself with either (1) current and historical information on conservation, or (2) conservation policies and the political and administrative aspects of their realization. By comparatively few teachers was he presumed to be primarily concerned with (1) the scientific theories and concepts underlying conservation practices, or (2) the co-ordination of the skills and techniques of conservation practices. The three categories of response most frequently cited corresponded in a general way with the three main categories in Table 33 (Major Contributions of Social Science), although much less unanimity among type groups was evident in Table 33 than in Table 34. Of course, the format of answers was much more structured in the question concerning the definition of a Generalist (compare Questions 14 and 15, in the Appendix), and this may account for the wider range of variation in responses to the question regarding Social Science contributions. However, there was no doubt that, given a choice of specified alternatives, the Generalist was defined in terms of Social Science criteria rather than technical or Physical Science criteria.

## PLACE OF THE GENERALIST IN CONSERVATION EDUCATION

Having defined the basic areas of Generalist concern, the next step was to inquire whether the Generalist has a role in conservation education and if so, what it is. To the question, "As you define him, do you believe the Generalist has a place in conservation education?" 78 per cent of all respondents answered "Yes" while only 5 per cent replied "No" (the remainder replied "Don't know," or gave no answer). The percentage answering "Yes" was reasonably close to the sample mean in all type groups. However, the Land-Grant and Large University group of teachers showed slightly less acceptance (74 per cent said "Yes" and 9 per cent "No"), while the Teachers' College group showed the highest degree of acceptance (84 per cent "Yes," 1 per cent "No"). On the whole there seemed to be a wider acceptance of Social Science as a field contributing to conservation education than of the Generalist as a possible representative of that field. This was particularly true among teachers in the Land-Grant and Large Universities.

Teachers who answered the question just described in the affirmative were then asked to specify the place or function of the Generalist in conservation education. This was another free-response question requiring the grouping of responses into categories. The results are shown in Table 35.

The All Teachers distribution in Table 35 shows that Public relations and publicity was cited nearly twice as often as the

TABLE 35  
MAJOR FUNCTION OF THE GENERALIST IN CONSERVATION EDUCATION

Functions Mentioned	Percentage of Teachers Mentioning				
	I	II	III	IV	
	All Teachers*	Land-Grant and Large Universities	4-year Colleges and Small Universities	Teachers' Colleges	Junior Colleges
(A) Teach conservation	11	13	13	10	8
(B) Translate research into action	13	14	11	17	8
(C) Co-ordinate the over-all picture	15	20	14	14	8
(D) Public relations and publicity	27	19	30	27	35
(E) Not specified	34	34	32	32	41
Total	100	100	100	100	100

\* Contains 20 teachers in Special Schools, not otherwise classified.

second-ranking category, Co-ordinate the over-all picture, and more than twice as often as Translate research into action or Teach conservation. The category Public relations and publicity carries with it the idea of salesmanship or advertising. In such a function the Generalist would be concentrating more on means and channels of communication than upon contributing to the subject-matter itself. The respondents seemed to feel the concept of generality was divorced from that of research, instead of feeling that the two concepts might be complementary. Very few teachers prescribed the formal teaching of conservation as the task of the Generalist. Almost universally the Generalist seemed to be regarded as some kind of intermediary among laymen, scientists, politicians, students, or other identifiable groups in the society. In such capacity his functions might be those of educator in general conservation, disseminator of information, leader of discussion, and promoter of other forms of communication in the field of conservation. Such a notion would presumably exclude specialized research in the field of communications with a view to making it more effective.

It is worth noting that of the teachers who answered "Yes" when questioned as to whether the Generalist had a role in conservation education, about one third did not specify the contribution the Generalist presumably could make. This indicates that many teachers in all type groups were either unclear in their own minds about the meaning of the term or else they had not fitted this kind of person into their conceptions of a program in conservation education. It will be recalled that about the same degree of uncertainty prevailed on the previous question where teachers who had affirmed the importance of Social Science in conservation education were asked to specify the contribution they thought it could make.

### WHO SHALL BE TAUGHT

Assuming that conservation is to be taught in the colleges and universities, information was sought regarding the views of teachers concerning the kinds of college students who should receive conservation instruction. Six alternatives were offered, ranging from All who major in science to All college students, and respondents were permitted more than one choice (see the Appendix, Question 17).

There was consistent agreement that all students should receive conservation education. While the rank order of the other categories was usually retained in all the type groups, the range of emphasis was considerable, particularly for All who work with

resources and All prospective teachers. In general, teachers in the Four-year Colleges and Small Universities and in the Junior Colleges followed the pattern of the All Teachers distribution. The variations from the over-all trend were confined to teachers in the Land-Grant and Large Universities group and in the Teachers' Colleges. This may be accounted for by the fact that the two answers, All who work with resources and All prospective teachers, each focused upon occupational fields that could be identified with one type of school. Thus, All who work with resources refers to students who would most likely be found in Group I schools, where Agriculture and the various aspects of natural resources would be taught as specialties. These students would less likely be studying at other types of schools, particularly at Teachers' Colleges. Conversely, teacher training would obviously be emphasized in Teachers' Colleges, and many prospective teachers would receive conservation education as a mandatory part of the teacher-training curriculum. However, these differences among several type groups of teachers did not alter the fact that a majority of all teachers felt that conservation should be taught to all college students.

#### IMPORTANCE OF CONSERVATION EDUCATION FOR LIBERAL ARTS STUDENTS

Although there could be little question concerning the desirability of conservation education for certain classifications of students preparing for particular occupational specialties or research interests, the question of the importance of such education for the mass of so-called liberal arts students still remained. These students, comprising the bulk of the student body in many schools, cannot be regarded as necessarily preparing for any conservation-oriented occupation. Only a very small fraction of liberal arts students at present receive any education in conservation. Hence, the views of conservation teachers on this point were expected to be not only of interest, but less predictable than their attitudes toward students in fields more specialized occupationally.

As shown in Table 36, about half of all teachers thought that conservation was an Essential subject of instruction for liberal arts students. Most of the remainder felt it to be Desirable or Appropriate. Only 2 per cent deemed it Nonessential. Among the type groups, the Four-year College and Small University group and the Junior College group were close to the All Teachers distribution of categories. The greatest departures from the sample mean occurred in the responses of the teachers in the Land-Grant and Large

TABLE 36

DESIRABILITY OF CONSERVATION AS A SUBJECT FOR LIBERAL ARTS STUDENTS

Desirability Category	Percentage by Type Group				
	All Teachers*	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Nonessential	2	2	3	1	3
(B) Appropriate	7	13	7	2	6
(C) Desirable	39	43	36	39	35
(D) Essential	49	40	53	58	53
(E) Not specified	3	2	1	0	3
Total	100	100	100	100	100

\* Contains 20 teachers in Special Schools, not otherwise classified.

Universities and in the Teachers' Colleges. In the former, only 40 per cent regarded conservation education Essential for liberal arts students, and 83 per cent regarded it as Essential or Desirable. In the latter group, by contrast, 58 per cent thought conservation education to be Essential and 97 per cent deemed it Essential or Desirable. These differences may be explained with a fair degree of plausibility in terms of the differences in institutional environment and professional background of the teacher respondents. In the Land-Grant and Large Universities, much research is carried on and many of the teachers of conservation are segregated in special colleges where classes are composed largely of prospective specialists and few liberal arts students are taught. In the Teachers' Colleges, in spite of the fact that teachers are being occupationally trained, the atmosphere is more nearly like that of the liberal arts colleges, and in addition, interest in conservation runs high. From this point of view, the difference in opinion between these two groups with respect to conservation education for liberal arts students is understandable.

When teacher attitudes were tabulated according to the several structural variables of their school types, the factor of school religious affiliation produced the only contrasts worthy of note. Here 54 per cent of teachers in Protestant-affiliated schools marked conservation as Essential training for liberal arts students, while only 46 per cent of the teachers in Catholic-affiliated institutions did so. In schools with no religious affiliation, 50 per cent of the teachers deemed conservation instruction Essential. Only 3 per cent of the



Protestant group considered conservation instruction Nonessential, as opposed to 8 per cent of the Catholic group.

#### PRESENTATION OF CONSERVATION TO LIBERAL ARTS STUDENTS

Although teachers were generally favorable to some education in conservation for liberal arts students, wide variations in response resulted when the teachers were questioned as to the best academic framework within which to present such materials (see Appendix, Question 19). Teacher opinion was fairly evenly divided among three choices. Twenty-nine per cent of all teachers thought conservation teaching would be most effective if Integrated into related subject-matter courses. Twenty-eight per cent thought the subject should be taught in Special Courses, while 27 per cent believed it should be presented In as many different ways as possible. Only 14 per cent thought it should be Integrated into both related and unrelated courses.

Considerable variation existed among the type groups. In the Land-Grant and Large Universities group, more than two thirds of the teachers favored either Integrated into related courses (36 per cent) or Special Courses (32 per cent). In the Teachers' College group, Special Courses (36 per cent) and In as many different ways as possible (32 per cent) were the favored choices. Teachers' College personnel were more favorable to Special Courses than any other group. The Junior College group had by far the largest proportion favoring Integration into both related and unrelated courses (24 per cent), and had the smallest proportion favoring Special Courses (14 per cent). The majority of this group favored either Integrated into related courses (32 per cent) or In as many different ways as possible (30 per cent). The Four-year College and Small Universities group was closest to the sample mean. The leading choice in this group was In as many different ways as possible (32 per cent), closely followed by Integrated into related courses (29 per cent) and Special Courses (28 per cent). Since In as many different ways as possible might represent the degree of general concern that teachers had about conservation as a problem, it is significant to note that the Land-Grant group of teachers was markedly lower in this category (20 per cent chose it) than were the other three groups. This is in keeping with the more optimistic outlook on the resource picture demonstrated by teachers in the Land-Grant group on previous questions. It may be noted that the Teachers' College group, which was most favorable to Special Courses, was the group actually possessing the highest in-

cidence of such courses, while the Junior College group, which was least favorable to the idea of Special Courses, had the lowest incidence of such courses actually being taught.

### CONSERVATION EMPHASIS FOR LIBERAL ARTS STUDENTS

Teacher opinion was requested regarding the relative emphasis that should be placed upon specified aspects of conservation in teaching liberal arts students. The teacher was given a list of aspects to be ranked in order of importance (see the Appendix, Question 20). These aspects were identical with the categories in Question 15 (definition of a Generalist). An index of teacher preference was constructed by assigning values to rank orders and combining these into composite ratings with due regard for the percentage of persons replying to each category. The most favorable rating was assigned the highest numerical value, so that the higher the index number, the higher the relative emphasis for the category.

Table 37 shows clearly that the preferred emphasis among the conservation teachers was on the Economic, sociological, and educational aspects of the subject. On this item the index of teacher preference showed remarkably little variation among the groups. Co-ordination of skills and techniques, stressing the technical aspects of conservation, was by far the least popular choice among all groups. The three middle categories were closely bunched, with

TABLE 37

ASPECTS OF CONSERVATION TO EMPHASIZE IN TEACHING LIBERAL ARTS STUDENTS

Aspect Category	Index of Teacher Preference				
	All Teachers*	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Co-ordination of skills and techniques	12	10	16	15	11
(B) Policies and administration	26	23	26	27	27
(C) Current and historical information	28	28	28	26	31
(D) Scientific theories and conditions	29	29	30	30	25
(E) Economic, sociological, and educational aspects	39	38	38	39	41

\* Contains 20 teachers in Special Schools, not otherwise classified.

slightly less emphasis being given to Policies and administration than was accorded Scientific theories and conditions or Current and historical information. The pattern of category distribution was similar to that of Table 34, except that there was more emphasis on Scientific theories and concepts with respect to teaching liberal arts students than was found in the definition of a Generalist. On the whole there is little doubt that the teachers consistently linked liberal arts conservation teaching with a Generalist type of orientation, and that this orientation was heavily slanted toward the social sciences.

### FORMS OF PRESENTATION FOR LIBERAL ARTS STUDENTS

In addition to selecting areas of emphasis, teachers were asked to judge the relative effectiveness of certain specified approaches in presenting conservation material to liberal arts students (see the Appendix, Question 21).

The Index of Teacher Preference<sup>4</sup> in Table 38 shows that to Relate conservation to individual interests was the approach most

TABLE 38  
APPROACHES TO CONSERVATION WHEN TEACHING LIBERAL ARTS STUDENTS

Presentation Category	Index of Teacher Preference				
	All Teachers*	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Depict man as part of "web of life"	120	105	126	125	126
(B) Stress imminence of depletion	132	111	129	141	135
(C) Appeal to self-interest	141	131	150	142	141
(D) Offer facts of conservation	154	151	163	149	146
(E) Relate conservation to individual interests	167	164	169	169	173

\* Contains 20 teachers in Special Schools, not otherwise classified.

<sup>4</sup> As in Table 37, it was necessary to assign qualitative weights to these methods, based upon their desirability. Since the desirability scale was already constructed in the questionnaire (see Question 21, Appendix), numerical weights were imposed upon this scale. Thus, the quantity 1 was equated with Poor, 2 with Medium, and 3 with Good. The values were then combined into an index similar to that explained for Table 37, with the higher index values indicating a higher regard for those methods of presentation.

preferred by the teachers in schools of all types. However, considerable support was given to each of the other suggested approaches. Certain previous findings regarding the type groups of teachers were corroborated. For example, teachers in Land-Grant and Large Universities were the least inclined to Stress imminence of depletion, while those in Teachers' Colleges were the most favorable toward this approach. In other words, the more pessimistic conservation outlook found in the Teachers' College group was reflected in their views regarding approaches to teaching and a similar reflection was found of the greater optimism toward resource supplies manifested by teachers in the Land-Grant group. The lack of popularity of the more environmental, or ecological, approach of Depicting man as part of the "web of life" was particularly noticeable in the Land-Grant group, while the method of Offering the facts of conservation was of greater than average popularity among teachers in Four-year Colleges and Small Universities. By and large, however, such group differences were comparatively minor, and the All Teachers distribution was reasonably representative of the type groups. Although preferences did appear, all suggested approaches received substantial support, and it appears evident that these teachers of conservation are far from being of the opinion that any one approach to the teaching of conservation to liberal arts students should be used to the exclusion of all others.

### SUMMARY

In keeping with the summary procedure followed in "Teacher Attitudes and Opinions Regarding Conservation Teaching," this chapter, a composite picture of the most prevalent categories is given for the variables treated in this section.

The profile of the modal teacher as depicted in Table 39 shows various points of consistency with the profile as depicted in Table 31. The modal teacher in the earlier profile was found to be in the Natural Science field; this is consistent with the importance assigned to that field in Table 39 (Variable 10). However, it should be noted that this type of correlation was not found in the case of certain other fields, notably Social Science, which accounted for comparatively few conservation teachers, but was accorded the second highest rank as a field of importance for education in conservation. The modal teacher was almost certain that Social Science could contribute to conservation education, but was much less definite as to what this contribution might be. Nor did he hold strong convictions with regard to the function of the Generalist,

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TABLE 39

FURTHER DOMINANT CHARACTERISTICS OF THE TOTAL SAMPLE OF  
CONSERVATION TEACHERS

Variable (Continuation of Table 31)	Dominant Category (Percentage of Sample)
10. Important fields of knowledge for teaching	Natural science (43)*
11. Can social science contribute?	Yes (88)
12. Major contribution of social science	Show economic value of conservation (15)†
13. Definition of generalist	Deals with economic, sociological, and educational aspects (54)*
14. Has generalist a place?	Yes (78)
15. Major function of generalist	Public relations and publicity (27)‡
16. To whom should conservation be taught?	All students (60)*
17. Desirability of conservation for liberal arts students	Essential (49)
18. Best method of presentation to liberal arts students	Integrate conservation into related courses (29)
19. Emphasis for liberal arts students	Economic, sociological, and educational aspects§
20. Best form of presentation for liberal arts students	Relate to individual student interests§

\* Variables 10, 13, and 16 allowed more than one answer by respondents.

† Dominant category for Variable 12 was Not Specified (29).

‡ Dominant category for Variable 15 was Not Specified (34).

§ No percentages given for Variables 19 and 20 since these were expressed by index numbers in their respective tables.

though feeling definitely that the latter had a place in conservation education. The modal teacher believed conservation education to be essential for all college students. In the case of liberal arts students, he thought the major emphasis should be given to Social Science aspects taught as a part of related courses. He felt that conservation teaching would be most effective if related to the experience and particular interests of each student. The latter finding coincides with the dominance of the *Personal Habit* category in Table 31 (Variable 9.) On the whole, the modal teacher seemed to be lacking in strong convictions regarding several of the major variables, while at the same time definitely affirming the importance of the Generalist approach to conservation education, particularly with respect to liberal arts students. In spite of these modal teacher opinions, however, the data on the incidence and type of conservation teaching, as presented in Chapter 5, indicate that the bulk of conservation education now being given does not reflect very much

of the Generalist (Social Science) approach, nor is it reaching the nonspecialist liberal arts student.

Thus there seems to be a real gap between the actual course offerings and the wishes of the teachers themselves. Yet the vagueness with which most teachers approached the problem of making suggestions indicates that there may be some inconsistency, or at least confusion, in the minds of many teachers when asked to be specific about course material and teaching methods.

In the following paragraphs, certain differences are pointed out between the modal teacher profile and similar profiles for the respective type groups of teachers.

Teachers in the Land-Grant and Large Universities differed from the modal teacher mainly on Variables 15 and 17. The largest proportion of these teachers believed that the major function of the Generalist was to co-ordinate the skills and techniques of conservation practices (Variable 15). It might be noted that this leaning toward the more technical side of conservation was further exemplified in the case of Variable 16, where the second choice of these teachers under "To whom should conservation be taught?" was All who work with natural resources. In registering their opinions regarding Variable 17, the teachers in this group showed less concern for reaching liberal arts students than did teachers in the other type groups. The largest proportion of these teachers thought conservation training merely Desirable rather than Essential for such students. On the whole, these variations from the modal teacher pattern would appear to reflect the specialized technical focus of many conservation teachers in the Land-Grant and Large University group.

Teachers in the Four-year Colleges and Small Universities were probably closest to the modal teacher profile, not only in order of categories, but in percentage distribution as well. The chief departure occurred on Variable 18, where the largest proportion advocated the presentation of conservation material to liberal arts students in as many different ways as possible. This attitude might represent either a sense of urgency regarding the conservation problem, or a lack of specific ideas on how to teach conservation.

The Teachers' College group seemed to have firmer convictions regarding conservation education than did any other group. This was particularly noticeable in Variables 12, 15, and 18, and in the higher than average percentages for the leading category in most other variables, particularly 13, 16, and 17. These teachers seemed to be highly concerned about the consequences of a lack of conservation (Variable 12) and felt more than other teachers that a



Generalist should contribute to action programs (Variable 15). This was also the group most desirous of reaching liberal arts students, particularly with special courses in conservation (Variables 17 and 18).

Junior College teachers showed greatest variation from the modal teacher profile on Variables 10, 12, 13, and 15. Among the fields felt to be important for conservation teaching, they assigned second place to Agricultural Science (Variable 10). This was consistent with the earlier finding, which showed Agriculture to be the second most important teaching field for the Junior College group. Stress by this group upon the consequences of a lack of conservation (Variable 12) and upon the need for presenting current and historical information (Variable 13) indicates a basic concern for warning students of past follies in the use of resources. When this concern is combined with a much heavier than average mention of public relations and publicity as the major function of the Generalist it seems likely that, of all the groups, the Junior College teachers were the least technical, and perhaps the least academic, in their approach to conservation education.

The least consistency in category pattern among the type groups was shown by Variables 12, 15, and 18. Interestingly enough, these variables were all functional in nature and were concerned with action rather than definition. Variables 12 and 15 also happened to be the ones in which the Not Specified category was actually the dominant one. The lack of consistency among the type groups heightened the lack of specificity present throughout the sample of these two variables. Teacher opinions regarding the best approaches in presenting conservation material seemed to coincide more with type of school than with teacher characteristics, even though the degree of variation among the categories was slight. For example, the Four-year Colleges and Small Universities had the least structured curricular programs of any type group, and teachers in this group were the most inclined to use any means at hand in presenting conservation. Likewise, the Teachers' Colleges had a high proportionate number of special conservation courses, and teachers in these schools were inclined to regard such courses as good vehicles for the teaching of conservation.

### *Combined Teacher-Attitude Profiles*

While it is erroneous to regard the modal teacher as a real individual, the data on the entire range of teacher variables suggest

some conclusions about the attitudes and opinions of teachers engaged in the teaching of conservation.

It was pointed out in "Teacher Attitudes and Opinions Regarding Conservation Teaching," this chapter, that the modal teacher, while manifesting strong interest in conservation, was not particularly concerned about the future of resource supplies. While he admitted there had been waste in the past, the future apparently held no real terror for him, since he felt that technology was capable of overcoming any shortages. He believed strongly that factual ignorance (rather than such things as selfishness and chicanery) has been responsible for conservation's lack of popularity, and that a widespread awakening to the value of conservation would have to be achieved through reaching each individual. The imposition of general social controls was considered a much inferior method.

This tempered optimism was then applied primarily to teaching situations that involved the so-called Generalist approach and the education of liberal arts students. In these areas the modal teacher appeared somewhat confused and inarticulate. He unmistakably identified the work of the Generalist with a social and cultural orientation, and evaluated it in positive terms (i.e., he felt that the Generalist could contribute). Yet his conviction faded off into vagueness and silence when he was asked to list precise functions and contributions. This lack of specificity was also apparent in his definition of conservation.

Thus, while the modal teacher felt that the individual, whether citizen or student, is the key to conservation education, he seemed uninformed about how to attain the goal of educating the individual. Forcible or indoctrinating methods were unpopular. This combination of attitudes raises the important question of just how much competence and sensitivity this modal teacher possesses. Do his vagueness and apparent superficiality result from lip service to morally acceptable ideas and from personal academic deficiencies or do they stem from a perceptive awareness of the complexities of motivation and judgment involved in changing social habits? The fact that many teachers exhibited a technical orientation toward conservation, and hence a lack of familiarity with, or interest in, the social and political aspects of the subject, may have accounted for their paucity of ideas in relating conservation to the needs and capabilities of nonspecialists. Additional research would be necessary to determine which of these explanations (or perhaps others) account for the characteristics of this modal teacher of conservation.

# 7

## ANALYSIS OF COURSES

This chapter examines some of the characteristics of college and university courses in which conservation material is taught. The data were derived from a course information sheet attached to the teacher-attitude questionnaire used as the basis for Chapter 6. About nine tenths of the teachers responding to the questionnaire gave some information regarding courses. The tabulated results showed a total of 961 courses available for analysis, only 30 per cent of which were courses devoted fully to conservation. Among the type groups of institutions, the Land-Grant and Large Universities had the highest ratio of courses to teachers and of courses to schools. On the average this group had the largest number of conservation teachers per school, and of conservation courses per teacher. Hence, the high course-school ratio.

It must be borne in mind that findings in the present chapter are stated in terms of courses, rather than teachers or schools. The type group classification of schools employed in the preceding chapters has been continued, but, as in Chapter 6, the Special Schools have not been treated separately, owing to the small number of schools, teachers, and courses involved. Courses from this group were, however, included in the All Course tabulations.

Mention should also be made of the difference between the course analysis reported in this chapter and the analysis of catalogue course material for Land-Grant and Large Universities presented in Chapter 5. The latter was a content analysis, made from school catalogues, and hence not based on teacher or administrator judgments. Therefore it was only partially equivalent to the administrative questionnaire used in the case of the other type groups, and it did not contribute to the data presented in this chapter.

Comparison of course distributions with corresponding teacher distributions for the structural variables previously treated in Chapter 6 revealed no pronounced shift either in category patterns or relative category strength. Those shifts in percentage that did occur were due almost exclusively to the increased representation of Land-Grant and Large Universities in the course analysis. In view of this consistency, the course distributions relating to the organizational variables have been omitted here, and the distributions found to exist for teachers were deemed applicable to courses.

### *General Course Characteristics*

#### TYPE OF COURSE

Although the course information sheet did not include a standard check-list of course types, it was possible to abstract from the completed sheets a number of categories delineating the academic framework within which conservation material was being presented. In Table 40 the incidence of courses is presented according to this classification. It will be noted that the categories are not all comparable as to scope. Some of them, such as Social Science

TABLE 40  
CLASSIFICATION OF COURSES IN WHICH CONSERVATION IS TAUGHT

Course Classification	All Courses	Percentage by Type Group			
		I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Workshop	2	2	2	2	2
(B) Seminar and advanced	2	3	1	1	0
(C) Management and policy (forest, range, wildlife, etc.)	9	16	6	1	4
(D) Conservation of natural resources or equivalent	10	8	12	19	1
(E) Social science	11	10	13	9	16
(F) Conservation in course title	12	13	12	19	4
(G) General introductory and survey	13	8	15	11	23
(H) Special area	19	22	11	27	12
(I) Physical or natural science	22	18	23	11	38
Total	100	100	100	100	100

and Physical or Natural Science, refer to broad academic fields, while others, such as Seminar and Advanced and General Introductory and Survey express the format and level of treatment. Since only a limited amount of information was available on these matters, the categories were chosen empirically after studying the data, instead of being based on some independent structural scheme.

The profile for the All Course sample was rather flat, with most of the variation occurring at the ends of the distribution. However, the type group patterns showed much sharper differences within categories than was indicated by the whole sample. The Land-Grant and Large Universities stressed Physical or Natural Science, Special Area, and Management courses, which were predominantly of a specialized or technical nature. These schools were close to the mean in most categories, except that they offered a high proportion of Management courses and a rather small proportion of General Introductory and Survey courses. The Four-year Colleges and Small Universities showed strongest concentrations in Physical or Natural Science, General Introductory and Survey, and Social Science, reflecting more of an orientation toward the general type of course as opposed to the specialized or technical type. Like the Land-Grant group, these schools were close to the sample mean in most categories, though usually on the opposite side from the Land-Grant schools (i.e., if the Land-Grant group was slightly above the mean in a certain category, the Four-year College and Small University group would be slightly below, etc.).

The Teachers' College and Junior College groups showed much more variation from one category to another, and also had high-low patterns that tended to offset each other, although the range was much wider than between the two groups previously discussed. Teachers' Colleges were especially strong in the categories Conservation of Natural Resources or Equivalent, Conservation in Course Title, and Special Area, pointing to a highly concentrated treatment of conservation material. In the Junior Colleges, on the other hand, conservation was taught mainly in courses which did not give it a dominant position; i.e., the Physical or Natural Science, General Introductory and Survey and Social Science categories. All in all, these findings reflect the organizational and teacher characteristics of the type groups as discussed in previous chapters.

Among the categories the widest range of incidence was found in Physical or Natural Science (from 38 per cent in Junior Colleges to 11 per cent in Teachers' Colleges) and Conservation of Natural Resources (from 19 per cent in Teachers' Colleges to 1 per cent in Junior Colleges). The narrowest range of incidence was found in

Workshop and in Seminar and Advanced (in no type group did either category account for more than 3 per cent of the total) and in Social Science (from 16 per cent in Junior Colleges to 9 per cent in Teachers' Colleges).

#### WHEN AND TO WHOM OFFERED

It was found that 97 per cent of the courses in the sample were offered regularly each academic year. No group of schools listed less than 95 per cent for this category, indicating that this was a uniform distribution.

However, in the distribution of courses by class of student there were considerable variations, both in the percentage distribution of categories within the All Course sample and in the pattern and range of categories found in each of the respective type groups. As shown by the All Course profile in Table 41, most courses were directed to either lower-class or upper-class students, but seldom to both groups together. Graduate students, comprising a fairly small fraction of total student enrollment, received much less attention than undergraduates.

TABLE 41

ACADEMIC LEVEL OF STUDENTS TO WHOM COURSES CONTAINING CONSERVATION WERE OFFERED

Student Level	Percentage by Type Group				
	All Courses	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) All	3	5	1	3	0
(B) Graduate	7	12	3	8	2
(C) Lower- and upper-class	10	8	17	8	3
(D) Upper and graduate	17	34	11	6	1
(E) Upper-class	28	25	35	37	3
(F) Lower-class	30	13	28	23	88
(G) Not specified	5	3	5	15	3
Total	100	100	100	100	100

The type group distributions corresponded to the nature of the schools themselves. The Land-Grant and Large Universities, accounting for the bulk of graduate and specialized course work, were particularly strong in Upper and Graduate and in Upper-Class offerings. These two categories accounted for about three fifths of all courses in this type group. The incidence of Lower-Class courses

and Physical or Natural Science, refer to broad academic fields, while others, such as Seminar and Advanced and General Introductory and Survey express the format and level of treatment. Since only a limited amount of information was available on these matters, the categories were chosen empirically after studying the data, instead of being based on some independent structural scheme.

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(A) All	3	5	1	3	0
(B) Graduate	7	12	3	8	0
(C) Lower- and upper-class	10	8	17	8	2
(D) Upper and graduate	17	34	11	6	3
(E) Upper-class	28	25	35	37	1
(F) Lower-class	30	13	28	23	3
(G) Not specified	5	3	5	15	88
Total	100	100	100	100	3
					100

The type group distributions corresponded to the nature of the schools themselves. The Land-Grant and Large Universities, accounting for the bulk of graduate and specialized course work, were particularly strong in Upper and Graduate and in Upper-Class offerings. These two categories accounted for about three fifths of all courses in this type group. The incidence of Lower-Class courses



(13 per cent) was much smaller than in any other type group, while the incidence of Graduate courses (12 per cent) was the highest for any type group. The Four-year Colleges and Small Universities, emphasizing liberal arts programs, were strongest in the categories Upper-Class, Lower-Class, and Lower- and Upper-Class. These categories accounted for four fifth of all courses offered. The pattern for Teachers' Colleges was somewhat similar, though with a smaller emphasis on the Lower- and Upper-Class category and a greater emphasis on Graduate courses. As would be expected, nearly all the Junior College courses were Lower-Class, except for a few scattered programs (evening courses, workshops, summer institutes, etc.) open to other types of students.

### CLASS ENROLLMENT

Teachers were asked to specify the number of students enrolled in each of their conservation courses, this being easily ascertained from class records. The All Course distribution in Table 42 shows that about two fifths of all courses had an enrollment of less than 20 students. Slightly more than a fifth enrolled 20 to 39 students, while slightly less than a fifth had 60 students or more. There was a noticeable gap in the category 40 to 59. The small percentage of courses in this category may reflect a current trend of college classes to either the very small or very large, depending upon the department and the focus involved.

The tendency toward small classes was most pronounced in the Land-Grant and Large Universities and the Four-year Colleges and Small Universities. Among the type groups, the Land-Grant group was the most inclined toward small classes and the least inclined

TABLE 42  
PERCENTAGE OF CONSERVATION COURSES HAVING SPECIFIED ENROLLMENTS

Class Enrollment	Percentage by Type Group				
	All Courses	I	II	III	IV
		Land-Grant and Large Universities	4-year Colleges and Small Universities	Teachers' Colleges	Junior Colleges
(A) 40-59	9	8	8	13	10
(B) 60 and over	18	13	17	28	26
(C) 20-39	22	22	20	26	28
(D) Under 20	39	48	43	17	26
(E) Not specified	12	9	12	16	10
Total	100	100	100	100	100

toward large ones. This result was in keeping with the pronounced tendency toward Upper-Class and Graduate courses in this type group, as revealed in Table 41. In the Teachers' Colleges the Land-Grant pattern was reversed, although the range between the high and low categories was smaller. Junior College classes were rather evenly distributed by size, with the exception of the low 40 to 59 category. The figures indicate that while the Land-Grant and Large Universities had far more courses offering conservation than did other groups, the comparative smallness of their classes made it probable that the number of students did not differ as much among the type groups as might have been inferred from the variation in their course distributions. The exception was in the Four-year College and Small University group, which not only had the smallest course-teacher and course-school ratios, but also had small classes, so that conservation courses in this group reached fewer students than similar courses in other groups.

#### PERCENTAGE OF TIME DEVOTED TO CONSERVATION

One index of teaching emphasis would appear to be the amount of time devoted to conservation material. Consequently teachers were requested to give the approximate percentage of class time devoted to conservation for each course where such material was taught. The results are shown in Table 43.

In only 30 per cent of all cases was the entire time of the course devoted to conservation material. The highest proportion of such courses was found in the Teachers Colleges (39 per cent), while the lowest proportion was found in Junior Colleges (7 per cent). The

TABLE 43  
PERCENTAGE OF COURSE TIME DEVOTED TO CONSERVATION

Percentage of Time	Percentage by Type Group				
	All Courses	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) 60-99	3	4	2	0	6
(B) 40-59	6	9	6	8	5
(C) 20-39	13	13	14	16	11
(D) 100	30	34	30	39	7
(E) Under 20	33	23	36	25	55
(F) Not specified	15	17	12	12	16
Total	100	100	100	100	100

over-all pattern of courses showed a definite tendency toward a relatively brief treatment of conservation. Thus 33 per cent of all courses devoted less than a fifth of their time to conservation, while an additional 13 per cent devoted 20 to 39 per cent of their time to such material. (In interpreting the table, it should be borne in mind that 15 per cent of all courses were in the Not Specified category). The Junior Colleges had by far the highest proportion of courses devoting less than 20 per cent of their time to conservation. The 60-99, 40-59, and 20-39 per cent categories showed no significant differences from one group of institutions to another.

### ASPECTS OF CONSERVATION TAUGHT

In the course information sheet, teachers were asked to check the aspects of conservation taught in their courses and to double-check the aspects receiving special attention. In addition to the physical resource aspects listed in the questionnaire (see the Appendix), the teachers supplied various Social Science aspects as write-ins. From these data an index of general emphasis was obtained, reflecting both the relative frequency with which the various aspects were offered, and the extent to which they were given special emphasis.<sup>1</sup>

As shown in Table 44 and Figure 5, the greatest emphasis in conservation teaching was placed on Soil, Water, and Forests, with Ecology and Economic Aspects close behind. The remaining aspects were distributed in a fairly regular order of frequency, although Limnology, the bottom category, was separated by a wide gap from the second lowest category, Minerals. One of the most interesting features of the All Course profile was the low rank of Minerals as compared with most other types of resources, and also as compared with the Economic and Social aspects of conservation.

The profiles of the various type groups were highly correlated. Comparison of these groups shows that in every category except one (Soil), the Teachers' College courses ranked first in general emphasis. This reflects the high proportion of courses in this group that are devoted solely to conservation and appears to indicate a more comprehensive coverage of the subject than in the other type groups. The rank order of categories for the Teachers' College

<sup>1</sup> This index was constructed by adding the percentage of single-check mentions to twice the percentage of double-check mentions for each category. In general those categories that ranked high in single-check mentions also ranked high in double-check mentions, except that in the social science categories the single-check mentions tended to be rather high and the double-check mentions rather low as compared with the physical resource categories. Thus, it might be concluded that while social science aspects were frequently touched upon, they were seldom emphasized (see text for an exception to this).

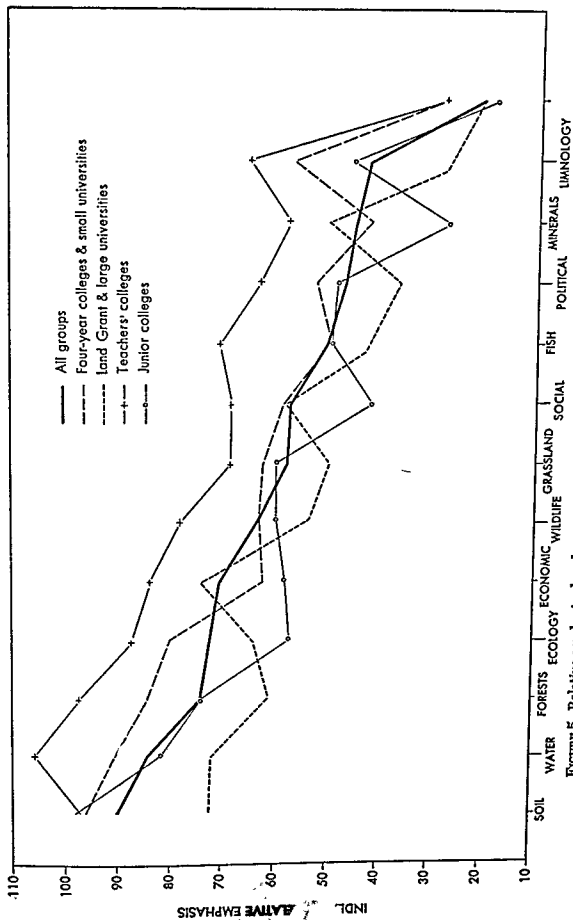


FIGURE 5. Relative emphasis placed upon conservation topics by teachers of concentrated courses.

TABLE 44  
ASPECTS OF CONSERVATION TAUGHT

Aspects of Conservation	Index of Utilization by Type Group				
	All Courses	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Limnology	22	22	27	27	18
(B) Minerals	43	28	57	67	47
(C) Political	46	51	42	58	28
(D) Fish	47	38	52	62	49
(E) Recreation	51	43	50	72	50
(F) Social	57	58	59	69	42
(G) Grassland	58	51	62	69	60
(H) Wildlife	63	55	63	79	60
(I) Economic	71	77	61	85	59
(J) Ecology	73	66	80	88	58
(K) Forests	76	62	85	98	76
(L) Water	85	72	91	108	83
(M) Soil	91	73	97	98	99

group corresponded to that of the All Course mean, except that Water instead of Soil received the greatest emphasis. The Four-year Colleges and Small Universities and the Junior Colleges were closest to the sample mean in most categories with the exception that Junior College courses were generally the weakest group in the Social Science aspects. The Land-Grant and Large Universities were at or below the sample mean in all categories except the Social Science ones. In fact, the Economic aspects of conservation ranked highest in emphasis in this group, while Soil, Water, and Forests were emphasized less than in the other groups. These findings were rather surprising in view of the fact that courses and curricula in the Land-Grant and Large Universities group had previously been shown to be more advanced in techniques and procedures and more comprehensive in scope than with the other groups of conservation.

Within the categories the rank or position was fairly consistent, although the rank was irregular, and the position was first in almost all cases.

#### APPROACH

It is found that several approaches are used in general (1) general

(3) skills and techniques of management, and (4) economic, political, and social philosophy. The teacher respondents were requested to rank these four approaches in the order in which they were applied in the teaching of each course. The results showed clearly that every type group was oriented toward Concepts and Principles as its major frame of reference. Skills and Techniques of Management was favored somewhat more in the Land-Grant and Large Universities than in the other groups, while General and Historical Information received greatest emphasis in the Four-year Colleges and Small Universities and in the Junior Colleges. The latter groups showed an almost identical distribution of categories. Economic, Political, and Social Philosophy was emphasized most in the Teachers' Colleges. However, this group made comparatively little use of Skills and Techniques of Management and General and Historical Information as approaches to the subject. Actually, most of the differences among type groups were relatively minor, as each of the four frames of reference received considerable emphasis in every group. However, Concepts and Principles was unquestionably the dominant approach. These results appear to be consonant with findings previously established.

An examination of the content of courses in conservation also made it evident that the category Concepts and Principles was the aspect of conservation most emphasized by teachers in each type of course, as well as in each type group of institutions. This dominance was less pronounced in the general courses than in the specialized. The latter courses were generally high in Skills and Techniques, inclined to be low in General and Historical Information and, to a lesser extent, low in Economic, Political, and Social Philosophy. The general course types usually reversed this emphasis. Skills and Techniques definitely received the most emphasis in Management courses, in courses having Conservation in the course title, and in Special Area courses. In these courses little emphasis was given to Economic, Political, and Social Philosophy and to General and Historical Information. Economic, Political, and Social Philosophy was emphasized most in Seminar and Advanced and Social Science courses, while General and Historical Information received the greatest emphasis in Conservation of Natural Resources, Social Science, and General Introductory and Survey courses.

#### TECHNIQUES EMPLOYED IN TEACHING CONSERVATION

The use of various teaching techniques for conservation courses has already been presented in Chapter 5 as a part of the institutional data. The present analysis, based upon returns from the teacher

TABLE 44  
ASPECTS OF CONSERVATION TAUGHT

Aspects of Conservation	Index of Utilization by Type Group				
	All Courses	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Limnology	22	22	27	27	18
(B) Minerals	43	28	57	67	47
(C) Political	46	51	42	58	28
(D) Fish	47	38	52	62	49
(E) Recreation	51	43	50	72	50
(F) Social	57	58	59	69	42
(G) Grassland	58	51	62	69	60
(H) Wildlife	63	55	63	79	60
(I) Economic	71	77	61	85	59
(J) Ecology	73	66	80	88	58
(K) Forests	76	62	85	98	76
(L) Water	85	72	91	108	83
(M) Soil	91	73	97	98	99

group corresponded to that of the All Course mean, except that Water instead of Soil received the greatest emphasis. The Four-year Colleges and Small Universities and the Junior Colleges were closest to the sample mean in most categories with the exception that Junior College courses were generally the weakest group in the Social Science aspects. The Land-Grant and Large Universities were at or below the sample mean in all categories except the Social Science ones. In fact, the Economic aspects of conservation ranked highest in emphasis in this group, while Soil, Water, and Forests were emphasized less than in the other groups. These findings were rather surprising in view of the fact that courses and curricula in the Land-Grant and Large Universities group had previously been shown to be more concerned with procedures and techniques than with the social aspects and consequences of conservation.

Within the categories themselves the range of emphasis was fairly constant. The rank order of type groups, by category, was irregular, with the exception that Teachers' College courses ranked first in almost every instance.

#### APPROACHES USED IN TEACHING CONSERVATION

It is possible to approach the teaching of conservation from several points of view. Some of the most common approaches are: (1) general and historical information, (2) concepts and principles,

courses emphasized Audio-visual Aids, but were generally the weakest group in other categories. Although some variations in the use of these teaching techniques exist among the type groups of schools, it is apparent that most institutions employed very similar techniques of teaching.

In the Land-Grant and Large Universities, most conservation courses were specialized in nature and given to more advanced students in small classes. Also, they placed considerable emphasis upon skills and laboratory work. These findings were in keeping with the kind of specialist orientation previously noted for this group of schools.

The Four-year Colleges and Small Universities were nearest the modal profile for the All Course sample. Courses in this group of schools were usually of the survey type, with conservation constituting only one part (often a very minor part) of each course. These courses were given primarily to small classes of upper-class students. Teaching of General and Historical Information supplemented the Concepts and Principles approach, which was standard in all type groups. This group stood at or above All Course mean in utilization of all types of teaching technique.

Courses in the Teachers' Colleges were the most consciously directed to Conservation as a field of interest in itself. Classes were generally larger than in the other groups, and the Social Science aspects received considerable attention. Upper-class courses predominated. Field Trips were utilized more extensively than in other groups, although as in all groups Lecture and Discussion was the predominant method of teaching.

Junior College courses were less specifically oriented toward conservation than any other group. The courses were predominantly of a general survey nature, were composed almost exclusively of lower-class students, and devoted very little time to conservation material. General and Historical Information was relied upon to supplement Concepts and Principles of conservation, and Audio-visual Aids received more than average use.

These type group patterns were generally in harmony with those brought out in the teacher-attitude analysis of Chapter 6, and to a more limited extent with the school patterns as set forth in Chapter 5.

### *Course Characteristics Versus School Characteristics*

An attempt was made to determine relationship between types of conservation courses, as set forth in Table 40, and the types of institutions offering such courses. The conclusion was reached that



questionnaire, is both broader in scope and wider in coverage. It includes returns from teachers in the Land-Grant and Large Universities group of schools, which the previous analysis did not. In addition, a greater number of techniques is considered. Also, the teachers were requested to rank the various techniques by order of emphasis and hence index numbers rather than percentages have been computed for the various categories as they are shown in Table 45.

TABLE 45  
TEACHING TECHNIQUES USED IN CONSERVATION COURSES

Techniques Used	Index* of Technique Use				
	All Courses	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Outside speakers	17	18	18	18	14
(B) Student projects and reports	25	26	25	22	20
(C) Audio-visual aids	27	23	30	28	30
(D) Laboratory work	29	33	30	26	26
(E) Field trips	32	31	32	36	30
(F) Lecture and discussion	42	43	43	40	39

\* Index computed as previously where comparative ratings were involved. See Chapter 6.

The dominance of Lecture and discussion in all groups should occasion no surprise, since it has been the keystone of pedagogy in most schools. The use of Outside Speakers was relatively minor. The type groups of institutions were rather similar in the degree to which each of these techniques was utilized, except that Junior Colleges ranked definitely lower than the rest in use of Outside Speakers, while Junior Colleges and Teachers' Colleges used Lecture and discussion somewhat less than did the other type groups. With respect to the remaining techniques, the emphasis varied from one group to another. The Land-Grant Colleges and Large Universities were strong in Laboratory Work and weak in Audio-visual Aids. The Four-year Colleges and Small Universities were closest to the All Course pattern, although definitely higher than the All Course mean in the use of Audio-visual Aids. Teachers' Colleges were the highest-ranking group in the use of Field Trips, but were weak in Laboratory Work and Student Projects and Reports. Junior College

tion, while also offering courses similar in nature to those offered by church-affiliated schools, offered in addition a large mass of courses dealing specifically with conservation of resources and with the skills and techniques essential to achieving that end. It has been shown previously that these courses dealing principally with resource management and techniques represent to a high degree the contribution of the Land-Grant Colleges and Large Universities.

### SIZE OF SCHOOL AND TYPE OF COURSE

The profiles displayed in Table 47 indicate that the smaller schools were concerned primarily with courses in which some conservation was offered in connection with related subject matter, or as a general survey. Such courses were offered chiefly in physical, natural, or social science fields, or as general introductory courses. In the group of schools with enrollments under 500 students, two thirds of the courses fell into one of these categories, while in the group with enrollments of 500 to 899, nearly one half did. In the group of schools with enrollments of 2,500 or more students, less than two fifths of the courses were of these types, while three fifths consisted of the more concentrated and specialized types of conservation courses. It is noteworthy that the proportion of courses offered in the social science area and the proportion concerned with advanced seminars and workshops varied little in relation to size of institution.

TABLE 47  
TYPE OF CONSERVATION COURSE BY SIZE OF SCHOOL ENROLLMENT

Type of Course	Size of Enrollment			
	Under 500	500-899	900-2,499	2,500 and Over
(Percentage Distribution of Courses)				
(A) Workshop	2	1	2	1
(B) Seminar and advanced	2	1	1	3
(C) Management	2	10	5	15
(D) Conservation of natural resources	6	7	12	12
(E) Conservation in title	7	14	17	11
(F) Social science	11	9	11	11
(G) Special area	15	19	21	19
(H) General introductory or survey	19	19	11	10
(I) Physical or natural science	36	20	20	18
Total	100	100	100	100
Number of courses	166	165	255	375

the general type of conservation course appeared to be related to a few institutional characteristics, such as religious affiliation and size of school enrollment. Other relationships among the many tested appeared to be of little importance.

### RELIGIOUS AFFILIATION OF SCHOOL AND TYPE OF COURSE

Table 46 shows pronounced differences in the types of conservation courses offered by Protestant-affiliated schools, Catholic-affiliated schools, and schools having no religious affiliation. In interpret-

TABLE 46  
TYPE OF CONSERVATION COURSE BY RELIGIOUS AFFILIATION OF SCHOOL

Type of Course	Religious Affiliation			
	None	Protestant	Catholic	Undetermined
	(Percentage Distribution of Course)			
(A) Seminar and advanced	3	0	0	0
(B) Workshop	3	3	0	0
(C) Management	11	1	0	10
(D) Conservation of natural resources	10	6	0	20
(E) Conservation in title	12	14	5	10
(F) Special area	20	12	5	10
(G) General introductory and survey	11	17	19	10
(H) Social science	9	17	29	25
(I) Physical or natural science	21	30	42	15
Total	100	100	100	100
Number of courses	798	121	21	21
Percentage of all courses	83	12.6	2.2	2.2

ing this table, one should bear in mind that the overwhelming majority of courses were offered in schools with no religious affiliation, a fact that made the Catholic and Undetermined categories rather sensitive in terms of percentage comparisons. However, the sample shows that in the Catholic schools, the 21 courses available for analysis were almost exclusively courses in physical, natural, or social science in which some conservation was included, or they were courses of the general introductory or survey type. The Protestant schools offered similar courses, but they were more inclined to offer in addition some courses with sufficient conservation content that the term "conservation" appeared in the course title. Also there were courses dealing with special areas in which conservation received considerable emphasis. The schools with no religious affilia-

TABLE 48

DISTRIBUTION OF CONCENTRATED CONSERVATION COURSES BY TYPE OF SCHOOL

Type of Course	Percent by Type Group				
	All Courses	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Conservation workshop	5	1	6	4	22
(B) Conservation education	6	7	6	7	0
(C) Conservation	20	10	29	25	11
(D) Specific resources	27	44	12	18	56
(E) Conservation of natural resources	42	38	47	46	11
Total	100	100	100	100	100
Number of courses	224*	73	77	60	9

\* Five courses were given in Specialized Schools. These are included in the All Course totals, but not in the type group analysis.

dominated by courses bearing the title "Conservation of Natural Resources," which accounted for 42 per cent of all courses in the concentrated group. The middle categories were Specific Resources (i.e., Soil Conservation, Forest Conservation, Wildlife Conservation, etc.), and courses entitled simply "Conservation." The two lowest categories included courses dealing with Conservation Education, either as extension or as teacher training, and Conservation Workshop courses, nearly always summer-type courses of short duration stressing field work and group activities. Many of the latter carried no academic credit. It should be emphasized that the five categories of concentrated courses differed widely among themselves in size and were very unequally distributed among the groups of schools. These numerical differences should be kept in mind when comparing the percentage-based profiles resulting from the distributions, particularly in the case of the profile for Junior Colleges, which was based on a total of only 9 courses.

In the Land-Grant and Large Universities most courses were of either the Specific Resources or the Conservation of Natural Resources type. The Four-year Colleges and Small Universities and the Teachers' Colleges were the strongest groups in offering courses labeled Conservation of Natural Resources, and courses entitled merely Conservation. These courses accounted for nearly three

Closely related to the religious affiliation of schools is their classification by source of funds. A tabulation of institutions on this basis, in relation to the types of conservation courses offered, did in fact yield somewhat similar results. Conservation courses offered by the privately supported schools were more likely to be of the general, or integrated, types than those offered by the publicly supported schools. Thus, in the former group of schools nearly two thirds of the courses dealing with conservation were courses in physical, natural, or social science in which some conservation was included, or they were of the general introductory or survey type. The corresponding proportion for the group of schools supported by public funds was two fifths.

Conversely, the type of course concerned with the management of natural resources amounted to 10 per cent of all conservation courses in publicly supported institutions, and only 2 per cent in the privately supported schools. However, courses in which conservation was a part of the course title held a position of about the same relative importance in both privately and publicly supported institutions.

### *Concentrated Conservation Courses*

The purpose of the present section is to give a more detailed picture of those courses having conservation as their stated major focus. The bulk of these were courses with the word "Conservation" in the course title. A few (13) courses did not have the word "Conservation" in their course titles, but nevertheless devoted 50 per cent or more of their time to conservation material and thus were considered to be concentrated courses. Most of these were seminars, management courses, or special area courses.

The 224 concentrated courses may be considered the core of teaching in the subject, even though they constituted less than one fourth of the conservation courses in the total sample. The distribution of these courses was analyzed in terms of the four type groups of schools used throughout the study. The chief question to be considered was "What position do the concentrated conservation courses occupy in the total conservation teaching programs of the different types of schools?" Answers were sought in terms of the relationship of these courses to both the schools in which they were offered and the teachers responsible for them.

### CONCENTRATED COURSES AND TYPE OF SCHOOL

The concentrated conservation courses were grouped into five categories, as shown in Table 48. The All Course distribution was

of all concentrated courses were found in Natural Science, Geography and Agriculture. Actually Agriculture was of little importance except in the Land-Grant and Large Universities, where it formed the leading category. In this type group the three leading categories were the same as in the All Course distribution, but their order of rank was reversed. The Land-Grant group was the strongest one in the minor categories of Conservation and Education. The Four-year Colleges and Small Universities and the Teachers' Colleges had almost identical profiles with respect to the three major categories as shown in the All Course distribution. However, these groups varied considerably from each other in the lesser categories. The Teachers' Colleges had the highest incidence of concentrated courses in the Social Science area, while the Four-year Colleges and Small Universities stood highest in the very minor Physical Science area. The few Junior College courses were found almost exclusively in Natural Science.

By comparing the results of Table 49 with similar findings regarding the subject-area distribution of all courses, as set forth in Chapter 5, it may be seen that the subject-area distribution of the concentrated conservation courses is somewhat different from that of all courses in which some conservation is taught. Most (83 per cent) of the concentrated courses were offered in the areas of Natural Science, Geography, and Agricultural Science, in that order. Physical Science ranked last with only 2 per cent. However, when ranked with respect to all conservation courses offered, Physical Science was second only to Natural Science, while Agricultural Science was fifth. Among the various types of school, the only variation of importance in the subject-area distribution of concentrated conservation courses occurred among the Teachers' Colleges, where Social Science rather than Agriculture ranked fourth.

A check was made to determine the subject areas in which the various types of concentrated conservation courses were most likely to be found. Half of all courses entitled "Conservation of Natural Resources" were found to be offered in Geography, while slightly more than a fourth were in Natural Science. A tenth were offered in Social Science and the remainder were distributed among the other subject areas in fairly even fashion. Half of the courses of the Specific Resources type were offered in Agriculture, while two fifths were in Natural Science. Slightly more than half of the courses entitled simply "Conservation" were in Natural Science, while a third were in either Geography (20 per cent) or Social Science (14 per cent). Of the courses in Conservation Education, 43 per cent were in Natural Science, with most of the remaining courses dis-

fourths of all the concentrated conservation courses offered in these two types of schools. The few courses offered in Junior Colleges were found mainly in the Specific Resources category.

Since there was considerable variation both in the total number of conservation courses offered by each group of schools and in the total number of concentrated courses, a comparison of these two factors provides a rough index of the degree of concentration among the school types. The comparison shows that the Teachers' Colleges had considerably the highest percentage (40) of concentrated conservation courses in proportion to their total conservation course offerings. The Four-year Colleges and Small Universities ranked second with 26.7 per cent, followed by the Land-Grant and Large Universities with 21.2 per cent. In the Junior Colleges only 6.5 per cent of all conservation courses were concentrated courses. These findings are in accord with the previous finding that the Teachers' Colleges are foremost among the various types of institution in offering special courses in conservation. The Four-year Colleges and Small Universities stand fairly high in this respect also, with the Junior Colleges running heavily to the integrated courses (see Chapter 5).

#### DISTRIBUTION OF CONCENTRATED COURSES BY SUBJECT AREA

Table 49 shows the distribution of concentrated conservation courses among the subject-matter fields previously considered under the administrative and teacher questionnaires. More than four fifths

TABLE 49

CONCENTRATED COURSE DISTRIBUTION BY SUBJECT AREAS, AND BY TYPE GROUP

Subject Area	Percentage by Type Group				
	All Courses	I	II	III	IV
		Land-Grant and Large Universities	4-year Colleges and Small Universities	Teachers' Colleges	Junior Colleges
(A) Physical science	2	0	4	0	1
(B) Education	3	6	5	1	1
(C) Conservation	4	7	1	5	0
(D) Social science	8	6	7	12	11
(E) Agriculture	18	37	5	5	11
(F) Geography	27	23	32	30	0
(G) Natural science	38	21	46	47	76
Total	100	100	100	100	100
Number of courses	224	73	77	60	9

More than two thirds of all teachers offering concentrated courses reported that they were teaching only one such course. About a fifth were teaching two courses, while 8 per cent taught three courses, and 6 per cent taught four courses. The greatest variance from this All Schools pattern was found in the Land-Grant and Large Universities. In this group, only a little more than half of the teachers reported that they were teaching one concentrated course, while the percentages reporting two, three, or four or more courses were substantially higher than in the All Schools mean. This tendency for teachers to handle more than one concentrated course clearly reflects the specialized nature of conservation teaching in the Land-Grant group. The remaining groups showed somewhat the same pattern as the All Schools distribution, except that the proportion of teachers handling only one course was higher in every case, while the proportion teaching three or more courses was lower. The highest proportion teaching one course was found in the Four-year Colleges and Small Universities, where four fifths of the teachers were in this category. Teachers offering four or more courses were almost entirely absent from all type groups except the Land-Grant and Large Universities group.

In making the above comparisons, it should be remembered that in the Land-Grant and Large Universities group of schools a considerably higher ratio of courses to teachers prevails as compared to the other three groups. Hence, while a fairly large number of teachers in the Land-Grant group offered concentrated conservation courses, they were also more likely to offer one or more other courses in which conservation is taught. Most of these courses, whether concentrated or not, were apt to deal with technical matters concerning a specific resource, and were given in the subject area of Agriculture.

### *Summary*

The general picture of the characteristics of conservation courses offered by the colleges and universities, as exemplified by analysis of data covering the 961 courses available for study, suggests that they might be classified in several ways. The classification used herein, although limited by the available data (see Table 40), appears to possess some value. On the whole, it seems clear that courses offered in the area of physical or natural science and those offered to cover a specialized subject area tend to stand out most prominently. Strong support comes from four other types of course, namely, General introductory and survey, the course with "Conservation" as a part of the title, the social science course dealing with



tributed equally among Education, Geography, and Agriculture. Most of the Conservation Workshop courses were in either Natural Science (54 per cent) or Education (28 per cent). Geography and Agriculture accounted for 9 per cent each. Thus Natural Science was either the foremost or the second-ranking subject area for every one of the course categories. The remaining subject fields showed wide variations in the percentages of the respective course categories found within each area.

#### DISTRIBUTION OF CONCENTRATED COURSES AMONG TEACHERS

A comparison was made among the groups of schools as to the number of teachers offering concentrated conservation courses in relation to the number offering conservation courses of any type. The comparison revealed that, in the Teachers' Colleges, half of all conservation teachers were teaching one or more concentrated courses. Two fifths of all conservation teachers in the Land-Grant and Large Universities group taught one or more concentrated courses, as did slightly less than a third of the teachers in the Four-year College and Small University group. The Junior Colleges made the poorest showing, with only about 7 per cent of all conservation teachers offering one or more concentrated courses. See Figure 6.

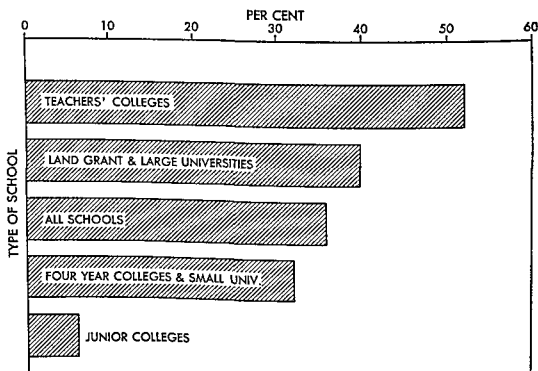


FIGURE 6. Percentage of all teachers of conservation offering concentrated conservation courses.

These so-called concentrated courses in conservation comprised 23 per cent of all courses offered in which some conservation was taught, according to the teachers reporting. In the Teachers' Colleges, however, they comprised 40 per cent of all conservation courses, in the Four-year Colleges and Small Universities, 27 per cent, in the Land-Grant and Large Universities, 21 per cent, and in the Junior Colleges only 6 per cent.

More than two thirds of all teachers offering concentrated conservation courses offered only one such course, and only 14 per cent offered three or more. The teaching of these courses, however, was more widely spread throughout the teaching faculty in some types of institution than in others. Thus, in the Teachers' Colleges, half of the conservation teachers taught at least one concentrated course, while in the Junior Colleges only 7 per cent of the teachers did so. The corresponding percentage for the Land-Grant and Large Universities was 40 per cent, and for the Four-year Colleges and Small Universities 31 per cent.

conservation, and the well-known type of course called "Conservation of Natural Resources." These six types of courses dominate the field to the extent of 87 per cent of all courses.

Nearly three fifths of all the courses in conservation are offered either to lower-class or to upper-class students, in about equal proportion. Colleges and universities in the Land-Grant group offer relatively fewer courses for lower-class students and relatively more for upper-class and graduate students, while the Junior Colleges, of course, offer nearly four fifths of their courses for lower-class students.

Class enrollments tend to be small, usually fewer than 20 students. The smallest classes are to be found in the Land-Grant group of schools, and the largest classes in the Teachers' Colleges and Junior Colleges.

The proportion of course time devoted to conservation is likely to be either less than 20 per cent or 100 per cent. There appears to be remarkable uniformity in this respect among the various types of institution. The course time devoted to conservation is devoted heavily to soil and water, with forests, ecology, and economics receiving strong support. Comparatively little time is devoted to minerals, limnology, fish, and the political aspects of conservation. In this respect there appears to be little variation among the different types of institution. The dominant approach to the subject is through concepts and principles. The teaching techniques are varied, with the classical lecture and discussion method easily dominating the field.

As compared to those institutions with some religious affiliation, the publicly supported schools offered a considerably richer variety of courses in which some conservation was taught. It is notable, also, that those institutions with fewer than 500 students enrolled offered a much narrower range of courses than schools with larger enrollments (see Table 47).

Courses employing the term "Conservation" in the title, plus those few courses devoting half or more of the teaching time to conservation, were styled "Concentrated Conservation Courses" and subjected to special analysis. Of the 224 courses so classified 33 per cent were offered by teachers in Land-Grant and Large Universities, 34 per cent by teachers in the Four-year Colleges and Small Universities, 27 per cent in the Teachers' Colleges and 5 per cent in the Junior Colleges and Special Schools. These courses ran heavily to the type of course called "Conservation of Natural Resources" (see Table 48). Four fifths of these concentrated courses were offered in the subject areas of natural science, geography, and agriculture.

As most of the evaluation questions were of the free-response variety, the structuring of a manageable set of categories was difficult. Sometimes the answers were so brief or ambiguous that the exact meaning was in doubt; in this case, the authors did their best to interpret them, bearing in mind the possibility of error. Occasionally, answers were so unusual that they could be made to fit none of the selected categories; these were either placed in a heterogeneous "other" category, or dropped from the tabulation.

### *Administrative Evaluation of Conservation Education Programs*

One of the most striking features of the data drawn from the administrative questionnaire was the high percentage of respondents in the schools teaching no conservation who did not answer the questions dealing with evaluation. It is difficult to account for this lack of response, although certain plausible reasons may be suggested. In the first place, when respondents checked "None" for resident conservation teaching (in Question 6, Appendix) they may have felt that the remainder of the questionnaire was not applicable to them, even though they were asked to omit only the next five questions. Thus, carelessness or misinterpretation of instructions was probably a major factor responsible for the neglect of the later evaluative questions. Another possible explanation is that respondents in nonteaching schools may have had little interest in conservation as part of their curriculum, and hence no intention of planning to include it in the future. Personal unwillingness to go on record with an evaluative statement may have influenced still others. But whatever the actual combination of factors may have been, the fact remains that the nonteaching schools showed a weak response to the evaluative questions. Therefore, the patterns of response from these schools may be considered less authoritative than comparable patterns for the schools teaching conservation.

### ADEQUACY OF CONSERVATION MATERIALS IN LIBRARY

The concept of adequacy is a highly subjective one, and can reflect a broad range of standards. Consequently, some respondents raised the question of what was meant by "adequate" while others amplified the term by using such qualifying phrases as "for our needs," "in view of our objectives," etc. Nevertheless, most respondents assumed a meaning and rendered a judgment.

The data in Table 50 afford a comparison of type groups for both teaching and nonteaching schools. In discussing Table 50 and subsequent tables in this chapter, "satisfaction" will be equated with

# 8

## ADMINISTRATIVE AND TEACHER EVALUATION

This study of the extent to which conservation of natural resources is being taught in the colleges and universities of the United States would not be complete without some appraisal of teaching programs by the administrators and teachers in charge of them. Consequently an opportunity was provided, in both the questionnaire to institutional administrators and the one to classroom teachers of conservation, for them to express their views on this important subject. Obviously, it was impossible to provide these persons with any yardstick or other objective measure by which they might render strictly comparable judgments. Thus, the views expressed represent administrator and teacher opinions based upon their individual criteria for evaluation, whatever these may have been. In evaluating the current performance of their respective institutions in the teaching of conservation, their judgments have inevitably been colored by their own attitudes and opinions with respect to the importance of this subject in the college curriculum.

The administrative questionnaire requested judgments from schools not teaching conservation as well as from those that did. However, many of the schools not teaching conservation did not respond to these questions. Furthermore, since the administrative questionnaire was not sent to land-grant and other large universities, no comparable report was received from them. The teacher questionnaire was sent only to teachers offering courses in conservation, so that no teacher data were obtained from the nonteaching schools. However, teachers offering courses in conservation in the land-grant and other large universities responded well and supplied a satisfactory body of data.

satisfied and the Four-year College and Small Universities group to be the least satisfied with library materials. However, the Junior College and Special School groups changed rank, with the latter being closest to the All Schools pattern, and the former showing next to the highest degree of satisfaction.

Without doubt, satisfaction with library materials was related to the presence or absence of conservation teaching in an institution. However, active dissatisfaction was almost the same for teaching and nonteaching schools. This latter finding might, of course, have been altered if more nonteaching schools had answered the question. In any event, it seems clear that respondents in Four-year Colleges and Small Universities were least pleased with their library facilities in conservation, while those in Teachers' Colleges were most pleased. The Junior College and Special School groups were intermediate, and were closest to the All Schools pattern.

In addition to the type-group distribution, responses to the question of adequacy were cross-tabulated with a number of the structural variables considered in the preceding chapters.

*Major Curriculum.* Among respondents in teaching schools whose major curriculum could be determined, those in schools classed as Liberal Arts, Arts and Sciences were least likely to be satisfied and most likely to be dissatisfied with their library materials (Adequate, 37 per cent, Inadequate, 32 per cent), while those from schools of Education stood at the opposite extreme (Adequate, 64 per cent, Inadequate, 16 per cent). Personnel in schools with Specialized and Diversified curricula were intermediate. In the Specialized group, 57 per cent thought their library materials Adequate while 17 per cent considered them Inadequate. In the Diversified group the percentages were 52 per cent Adequate and 24 per cent Inadequate. In the nonteaching schools, Education again showed the highest proportion of Adequate responses (22 per cent) and the lowest proportion of Inadequate responses (7 per cent). The Education group had the greatest percentage of Don't know or Not specified responses (64 per cent, as compared with 55 to 61 per cent in the other curriculum categories and 41 per cent in the Undetermined group). Respondents in all the other curriculum categories registered active dissatisfaction, to roughly the same degree. Thus in the Liberal Arts, Arts and Sciences, Specialized, and Diversified groups, library materials were considered Adequate by only 14, 16, and 17 per cent, respectively, while they were considered Inadequate by 22, 23, and 24 per cent, respectively. Respondents in schools with Undetermined curricula registered the highest degree of dissatis-

TABLE 50

ADEQUACY OF CONSERVATION MATERIALS IN LIBRARY, BY TYPE OF SCHOOL,  
AND WHETHER OR NOT TEACHING CONSERVATION

		Percentage of Schools Reporting				
Adequacy Category	Teaching Conser- vation	All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) Adequate	Yes	47	38	65	49	53
	No	14	10	22	20	17
(B) Fair (reasonable)	Yes	19	21	15	18	17
	No	5	5	7	6	1
(C) Don't know	Yes	2	2	2	2	0
	No	2	1	0	2	3
(D) Inadequate	Yes	27	30	16	29	20
	No	24	26	7	22	25
(E) Not specified	Yes	5	9	2	2	10
	No	55	58	64	50	54
Total number of schools	Yes	566	279	116	141	30
	No	458	250	14	125	69

Adequate responses, while "dissatisfaction" will be considered equivalent to responses of Inadequate.

Among the teaching schools, nearly half the respondents showed satisfaction with their library materials, while only about a fourth registered definite dissatisfaction. There was considerable variation among the groups of schools. The Four-year College and Small Universities group had the smallest proportion of Adequate and the highest proportion of Inadequate responses, while the Teachers' College group stood at the opposite extreme on both counts. Responses from Junior Colleges were close to the All Schools average, while the Special Schools registered next to the highest degree of satisfaction and next to the lowest degree of dissatisfaction. Thus the Teachers' Colleges, which were apparently doing the most concentrated work in conservation (see Chapter 5), also had the highest proportion of Adequate responses in connection with conservation materials in their libraries.

Among the nonteaching schools, allowing for more than half in the Don't Know or Not Specified categories, there was a swing to dissatisfaction, in that nearly twice as many respondents thought their library supply of conservation materials was Inadequate as thought them Adequate. As in the teaching schools, the type group distribution showed the Teachers' College group to be the most

greater proportion of Don't Know and Not Specified responses, and a much narrower range in other categories of response.

*Sex of Student Body.* More than four fifths of the teaching schools and nearly two thirds of the nonteaching schools were classed as Coeducational. Female teaching schools outnumbered Male 60 to 24, while Female nonteaching schools numbered 86, as compared with 67 Male schools. Among those teaching conservation, 47 per cent of the coeducational schools and 50 per cent of the schools for male students only judged their library materials to be Adequate. Schools for female students only were apparently less satisfied, since only 30 per cent reported Adequate libraries and 32 per cent thought their libraries Inadequate for conservation teaching. Correspondingly, 27 per cent of the respondents at coeducational schools, but only 11 per cent of those at schools exclusively for male students reported inadequate libraries.

Table 51 summarizes the whole pattern of library adequacy as shown by the school questionnaire, in terms of "high adequacy" and "low adequacy" patterns.

#### ADEQUACY OF CONSERVATION TEACHING

The factor of teaching adequacy was similar to library adequacy, in the sense that the word "adequacy" was likely to be interpreted the same way in both instances by each respondent. Therefore, the distributions for the two factors were assumed to be comparable when considered for identical school variables.

Table 52 indicates that respondents in teaching schools had pronounced views regarding the adequacy of conservation teaching in their institutions, since only 7 per cent fell in the Don't Know or Not Specified categories. In the All Schools pattern there was a fairly even division between respondents who were satisfied with conservation teaching (39 per cent) and those who felt it to be Inadequate (44 per cent). An additional tenth felt it to be Fair (reasonable). In no type group did the Adequate percentage outweigh the Inadequate. In the Four-year Colleges and Small Universities and in the Special Schools the Division of percentages was exactly even, while in the Teachers' Colleges the Inadequate response was only two percentage points greater. Only in the Junior Colleges was there a pronounced preponderance of Inadequate responses. It is worth noting that the Fair (reasonable) category, representing a moderate degree of satisfaction, was much more discriminatory among school types than were the other categories. In this category the Teachers' Colleges were markedly stronger than the other



faction with library materials in the case of both teaching and non-teaching schools. Percentages for this group were: in teaching schools, Adequate 22 per cent, Inadequate 40 per cent; in nonteaching schools, Adequate 11 per cent, Inadequate 35 per cent.

*School Enrollment.* The degree of satisfaction with library materials in conservation varied rather directly with the size of school. Respondents in smaller schools showed considerably less satisfaction than those in larger ones. Thus only 39 per cent of the respondents in teaching schools with fewer than 500 students thought their library materials Adequate, as compared with 51 per cent in schools of 900-2,499, and 52 per cent in schools of 2,500 and over. Conversely, in the Under 500 schools, 34 per cent considered their library materials Inadequate, as compared with 17 per cent in schools of 2,500 and over. In nonteaching schools the same pattern of variation was found, except that the range among categories was much smaller (Adequate, from 14 per cent in the small schools to 22 per cent in the large schools, Inadequate, from 26 per cent in the small schools to 18 per cent in the large schools). Thus enrollment was more discriminatory among teaching than among nonteaching schools.

*Religious Affiliation.* Among respondents in teaching schools, those in Protestant-affiliated and Catholic-affiliated schools were much less satisfied with their library materials in conservation than were those in schools with no religious affiliation. Thus 28 per cent of administrators in Protestant and 29 per cent in Catholic schools called their materials Adequate, as compared with 57 per cent in nonaffiliated schools. Conversely, only 21 per cent of respondents from the latter schools considered their materials Inadequate, as compared with 38 per cent in the Protestant and 29 per cent in the Catholic group. The pattern of responses for nonteaching schools conformed to the general pattern for teaching schools, though with a narrower range of variation among categories.

*Major Source of Funds.* There was a pronounced difference between respondents in publicly supported and privately supported schools with respect to their opinions concerning adequacy of library materials. Among respondents in the teaching schools, 60 per cent of those in the Public group thought their library holdings Adequate, while only 33 per cent of those in the Private group thought so. In the Public group, 20 per cent considered their library materials Inadequate, as compared with 33 per cent in the Private group. This pattern was followed in the nonteaching schools, except for a much

greater proportion of Don't Know and Not Specified responses, and a much narrower range in other categories of response.

*Sex of Student Body.* More than four fifths of the teaching schools and nearly two thirds of the nonteaching schools were classed as Coeducational. Female teaching schools outnumbered Male 60 to 24, while Female nonteaching schools numbered 86, as compared with 67 Male schools. Among those teaching conservation, 47 per cent of the coeducational schools and 50 per cent of the schools for male students only judged their library materials to be Adequate. Schools for female students only were apparently less satisfied, since only 30 per cent reported Adequate libraries and 32 per cent thought their libraries Inadequate for conservation teaching. Correspondingly, 27 per cent of the respondents at coeducational schools, but only 11 per cent of those at schools exclusively for male students reported inadequate libraries.

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Table 52 indicates that respondents in teaching schools had pronounced views regarding the adequacy of conservation teaching in their institutions, since only 7 per cent fell in the Don't Know or Not Specified categories. In the All Schools pattern there was a fairly even division between respondents who were satisfied with conservation teaching (39 per cent) and those who felt it to be conservation teaching (44 per cent). An additional tenth felt it to be Fair (reasonable). In no type group did the Adequate percentage outweigh the Inadequate. In the Four-year Colleges and Small Universities the Inadequate. In the Division of percentages was exactly even, while in the Teachers' Colleges the Inadequate response was only two percentage points greater. Only in the Junior Colleges was there a pronounced preponderance of Inadequate responses. It is worth noting that the Fair (reasonable) category, representing a moderate degree of satisfaction, was much more discriminatory among school types than were the other categories. In this category the Teachers' Colleges were markedly stronger than the other

TABLE 51  
DOMINANT LIBRARY ADEQUACY CATEGORIES FOR TEACHING AND NONTeachING\* SCHOOLS

School Variable	High Adequacy (Satisfaction)		Low Adequacy (Dissatisfaction)	
	Teaching	Nonteaching	Teaching	Nonteaching
1. Type group	Teachers' Colleges (65)	Teachers' Colleges (22)	Four-year colleges and small universities (30)	Four-year colleges and small universities (26)
2. Major curriculum	Education (64)	Education (22)	Liberal arts, Arts and Sciences (32)	Diversified (24)
3. Enrollment	2,500 and over (52)	2,500 and over (22)	Under 500 (34)	Under 500 (26)
4. Religious affiliation	None (57)	None (16)	Protestant (38)	Protestant (28)
5. Major source of funds	Public (60)	Public (19)	Private (33)	Private (26)
6. Sex of student body	Male (50)	Coed (16)	Female (32)	Male (30)

\* It should be remembered that the dominant category for nonteaching schools was always Not Specified. The dominant category listed for these schools in the table was actually the second highest category.

TABLE 52  
ESTIMATED ADEQUACY OF CONSERVATION TEACHING

Adequacy Category	Teaching Conser- vation	Percentage of Schools Reporting				
		All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) Don't know	Yes	2	3	0	1	3
	No	1	1	0	1	1
(B) Fair (reasonable)	Yes	10	5	19	11	7
	No	1	1	7	2	0
(C) Inadequate	Yes	44	42	41	58	40
	No	19	18	29	26	12
(D) Adequate	Yes	39	42	39	28	40
	No	14	12	7	18	17
(E) Not specified	Yes	5	8	1	2	10
	No	65	68	57	53	70
Total number of schools	Yes	566	279	116	141	30
	No	458	250	14	125	69

groups, while the Four-year Colleges and Small Universities were well below the All Schools mean. Comparison of Table 52 with Table 50 indicates that the general level of satisfaction with conservation teaching was consistently lower than the level of satisfaction with conservation facilities in libraries, and that active dissatisfaction was present to a greater degree in the case of teaching than in the case of library materials.

For the nonteaching schools, the patterns were less variable. Two out of three respondents made no evaluative judgments of teaching adequacy; and of the one third who did answer, the incidence of dissatisfaction was only slightly greater than that of satisfaction. The Teachers' Colleges respondents were most dissatisfied, but since they were so few in number, it should not be assumed that they were representative of a type trend. Oddly enough, respondents from the Junior Colleges were the most satisfied with the status of teaching in their institutions. This unexpected result is probably due to the much higher response to the question among Junior Colleges.

Distributions for teaching adequacy were made on the basis of the same school structural variables employed for library adequacy.

*Major Curriculum.* Among the teaching schools with a known curriculum emphasis, the highest degree of satisfaction was found in the Specialized group (Adequate 40 per cent, Inadequate 30 per

cent, Fair (reasonable) 13 per cent). The greatest dissatisfaction was registered by respondents in *Diversified curricula* (Adequate 31 per cent, Inadequate 53 per cent, Fair (reasonable) 7 per cent). Responses from *Education curricula* were evenly balanced as between Adequate and Inadequate (each, 39 per cent), while this group had considerably the largest proportion under Fair (reasonable) (20 per cent). Liberal Arts, Arts and Sciences curricula also showed a fairly even division of opinion, though leaning slightly on the side of dissatisfaction (Adequate 39 per cent, Inadequate 44 per cent, Fair (reasonable) 5 per cent).

Approximately three fifths to three fourths of schools in the non-teaching type groups did not respond to this question. Among those that did, schools with the *Specialized* and *Diversified curricula* had the highest proportion of respondents considering conservation teaching to be Adequate (17 per cent in each case), while the highest percentages considering it Inadequate were found in *Education* (29 per cent) and *Diversified* (22 per cent).

*School Enrollment.* The pattern of Adequate and Inadequate responses for teaching schools in Table 53 shows that the variation by enrollment category was negligible. Schools in the *Under 500* category had slightly the highest proportion of respondents considering conservation teaching to be Adequate and also slightly the highest proportion feeling it to be Inadequate. Otherwise, there was no consistent pattern of variation by size of school. In the non-teaching schools, respondents from the larger schools showed a greater tendency to consider conservation teaching Adequate than

TABLE 53  
ADEQUACY OF CONSERVATION TEACHING BY SCHOOL ENROLLMENT

Enrollment Category	Teaching Conservation	No. of Schools	Adequacy of Teaching (Percentage of Schools Reporting)			
			Adequate	Fair	Inadequate	Don't Know Not Specified
(A) Under 500	Yes	225	39	3	43	15
	No	265	14	1	22	65
(B) 500-899	Yes	128	35	7	42	16
	No	96	16	2	13	69
(C) 900-2,499	Yes	152	36	5	35	24
	No	69	19	5	19	57
(D) 2,500 and over	Yes	61	33	10	40	16
	No	28	21	8	11	61
Total		1024	—	—	—	—

did those from the smaller schools, but no consistent pattern of variation by size of school was evident in the case of Inadequate responses. However, in the nonteaching schools, twice as large a proportion of respondents in schools Under 500 considered conservation teaching Inadequate as in schools of 2,500 and over. In all instances, the actual percentage range among enrollment categories was narrow, suggesting that enrollment was not a key variable in determining teaching adequacy.

*Religious Affiliation.* From Table 54 it can be seen that among respondents in teaching schools, the Catholic group showed the greatest degree of satisfaction and the smallest degree of dissatisfaction with conservation teaching, while in schools with no religious affiliation these positions were reversed. Among respondents

TABLE 54

ADEQUACY OF CONSERVATION TEACHING BY RELIGIOUS AFFILIATION OF SCHOOL

Religious Affiliation	Teaching Conservation	No.* of Schools	Adequacy of Teaching (Percentage of Schools Reporting)			
			Adequate	Partially Adequate	Inadequate	Don't Know Not Specified
(A) None	Yes	353	35	9	42	14
	No	166	20	2	15	63
(B) Protestant	Yes	141	39	1	41	19
	No	130	7	1	25	67
(C) Catholic	Yes	46	47	5	26	22
	No	97	8	0	22	70

\* Affiliation of 91 could not be determined, and these were not cross-tabulated.

in nonteaching schools, the None group had the highest proportion indicating satisfaction and the smallest proportion registering dissatisfaction. The Protestant and Catholic groups were remarkably similar in that the Inadequate responses outweighed the Adequate about three to one in both groups. In general, dissatisfaction was more prevalent than satisfaction (except in the case of those Catholic schools teaching some conservation), regardless of whether conservation was taught.

*Major Source of Funds.* Respondents from privately supported teaching schools were better satisfied with conservation teaching in their institutions than were those in publicly supported schools. In the Private group, 43 per cent considered conservation teaching Adequate, as compared with 33 per cent in the Public group. Thirty-

eight per cent in the Private group felt teaching to be Inadequate, as compared with 43 per cent in the Public category. Percentages considering teaching to be Fair (reasonable) were: Private 10 per cent, Public 20 per cent. In nonteaching schools, 58 per cent in Public and 68 per cent in Private institutions were in the Don't Know or Not Specified categories. Among those who answered the question, the response was as follows: in Public schools, Adequate 19 per cent, Inadequate 20 per cent, Fair (reasonable) 3 per cent; in Private schools, Adequate 13 per cent, Inadequate 18 per cent, Fair (reasonable) 1 per cent. These differences were apparently not significant.

*Sex of Student Body.* Among teaching schools, the Female group had the highest proportion of respondents registering satisfaction with conservation teaching (57 per cent), while the Coeducational group had the lowest (32 per cent). Male schools occupied an intermediate position (44 per cent). The highest proportion of respondents reporting dissatisfaction came from the Coeducational schools (43 per cent), while the lowest proportion was found in the Male group (22 per cent). In the Female schools 27 per cent registered dissatisfaction. Among nonteaching schools the highest rate of satisfaction was expressed by the Male group of schools (15 per cent), while most dissatisfaction was indicated by the Coeducational group (23 per cent).

The table on page 169 summarizes the over-all pattern of teaching adequacy in terms of teaching and nonteaching schools.

Table 55 shows that there was very little similarity between the profiles of teaching and nonteaching schools. This was in sharp contrast to the findings in Table 51. Furthermore, teaching school percentages in the High Adequacy profile were generally higher and those in the Low Adequacy profile were lower in Table 55 than in Table 51. This indicates a marked decrease in satisfaction and an increase in dissatisfaction with conservation teaching, as compared with conservation materials in the library. Among the nonteaching schools, there was little difference in adequacy levels for teaching programs and for library facilities. However, there was an increase in Not Specified categories for teaching adequacy. This latter increase was drawn chiefly from the Fair (reasonable) categories, which were generally much smaller for the teaching variable than for the library variable.

Finally, a comparison of the percentage distributions for the teaching tables and the library tables shows that there was usually a much narrower range for categories in the teaching variable, some-

TABLE 55  
DOMINANT TEACHING ADEQUACY PATTERNS FOR TEACHING AND NONTeachING\* SCHOOLS

School Variable	High Adequacy (Satisfaction)		Low Adequacy (Dissatisfaction)	
	Teaching	Nonteaching	Teaching	Nonteaching
1. Type group	Four-year colleges and small universities	Junior colleges	Junior colleges	Teachers' colleges
2. Major curriculum	Specialized	Diversified	Diversified	Education
3. Enrollment	Under 500	2,500 and over	Under 500	Under 500
4. Religious affiliation	Catholic	None	None	Protestant
5. Majority ethnic group	Private	Public	Public	Public
6. Sex of student body	Female	Male	Coeducational	Coeducational
		(42)	(18)	(58)
		(40)	(17)	(53)
		(39)	(21)	(43)
		(47)	(20)	(42)
		(43)	(19)	(43)
		(57)	(15)	(43)

\* It should be remembered that the dominant category for nonteaching schools was always Not Specified. The dominant category listed for these schools in the table was actually the second highest category.



times less than 5 per cent. This meant that the categories were less discriminatory for teaching than for the library, and that teaching evaluations were much more uniform throughout the entire school sample, regardless of the categories used. Whatever the reason may be, satisfaction with library adequacy did not appear to be closely related to satisfaction with teaching adequacy, particularly among the teaching schools.

### IMPROVEMENT OF CONSERVATION TEACHING

In view of the fact that many schools were concerned with improving their curricular offerings, their plans for expansion or alteration of conservation programs, if any, are of interest for this study.

Among the schools teaching conservation, about one in four reported some plans for improvement of the teaching program. Among the schools not teaching conservation, less than one in five reported having any such plans. Most of the latter group either reported no plans or failed to answer the question. Among the schools teaching conservation, the Teachers' Colleges and the Junior Colleges led, with nearly one in three reporting plans; but less than one in five of the Special Schools reported any plans. About one in four of the Four-year Colleges and Small Universities reported plans (see Table 56).

TABLE 56  
PLANS FOR IMPROVEMENT OF CONSERVATION TEACHING

Improvement Category	Teaching Conservation	Percentage of Schools Reporting				
		All Schools	I 4-year Colleges and Small Universities	II Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) Have plans	Yes	27	24	32	30	17
	No	4	3	7	6	3
(B) Uncertain and don't know	Yes	2	2	0	2	0
	No	2	1	7	2	0
(C) No plans	Yes	66	66	66	65	77
	No	47	43	29	57	49
(D) Unspecified	Yes	5	8	2	3	6
	No	47	53	57	35	48

Thus, it can be seen that few of the nonteaching schools were anticipating any improvement with respect to the teaching of conservation. Consequently, they were not tabulated further, and the plans of the teaching group alone were considered. Since the exact nature and number of plans listed was decided by each respondent,

a few schools listed more than one kind of proposal. Therefore, the following analysis of reported plans is presented in terms of major types of plans, by numbers of times mentioned, rather than in terms of number of schools reporting.

Plans to add new or special courses in conservation received most frequent mention. There was a somewhat greater tendency toward plans of this kind in the Four-year Colleges and Small Universities and in the Teachers' Colleges than in the Junior Colleges and Special Schools. Plans to revise or add conservation material to present courses were mentioned about three fourths as often as plans for new or special courses. By far the greatest emphasis on plans of this type was found in the Teachers' Colleges and Junior Colleges. Other types of plans were mentioned about half as often as the top category. They were most prominent in responses from Junior Colleges, but were not entirely absent from any type group. Types of plans falling into the "Other" category included (1) summer courses and workshops, (2) co-operation with nonacademic agencies (foundations, governmental departments, etc.), and (3) encouraging or requiring conservation courses for certain programs of study (education, ministry, etc.). Thus the great majority of contemplated teaching improvements were in the area of curriculum additions and revisions.

#### ASSISTANCE AND STIMULATION DESIRED

The respondents were asked to stipulate the kinds of help, provided either by outside agencies or by the institutions themselves, that they felt would be most desirable in improving their conservation education programs (see Question 16 of the administrative questionnaire, in the Appendix).

The pattern among teaching schools as shown in Table 57 indicates that more than half of them specified certain forms of assistance for which a need was felt. Negative responses were negligible, although two in five did not answer the question at all. Respondents in Teachers' Colleges were most desirous of assistance, while those in Junior Colleges and Special Schools were less definite than average about forms of aid that might be of help. The nonteaching group was characterized by a lack of response, with only about one school in ten offering any positive suggestion. Eighty-six per cent made no answer.

The number of suggestions for assistance offered by the nonteaching schools was so few that they were not considered further. The teaching schools, however, put forward many suggestions, and since the question set no limitations, the number exceeded the total

TABLE 57  
NEED FOR ASSISTANCE IN IMPROVING CONSERVATION EDUCATION

Expressed Need	Teaching Conser- vation	Percentage of Schools Reporting				
		All Schools	I 4-year Colleges and Small Universities	II 'Teachers' Colleges	III Junior Colleges	IV Special Schools
(A) None	Yes	1	0	3	2	0
	No	1	0	0	3	3
(B) Don't know	Yes	3	3	0	5	3
	No	3	4	0	2	1
(C) Assistance necessary	Yes	56	57	65	48	47
	No	10	10	7	12	3
(D) Not specified	Yes	40	40	32	45	50
	No	86	86	93	83	93

number of schools replying. In order to simplify analysis these suggestions were grouped under four heads, namely; Teaching Aids and Curricula, Personnel and Administration, Financial, and All Other.

The group of suggestions under the head of Teaching Aids and Curricula was twice as large as those grouped under Personnel and Administration, and more than three times as large as those grouped under Financial. The All Other group was a tenth smaller than the Financial group. This ranking held for all four types of institution, with the exception of the Teachers' Colleges, where the All Other category ranked third. As might be expected, the proportion of all suggestions for assistance classified under Teaching Aids and Curricula was relatively smaller, though still the dominant category for the Teachers' Colleges. All others were surprisingly uniform.

The content of these categories may be listed as follows. The category, Teaching Aids and Curricula, contained suggestions relating to (1) physical facilities, such as laboratories and greenhouses, (2) visual aids, (3) books and literature, (4) field work and demonstrations, (5) more conservation emphasis in present courses, (6) additional courses, (7) more research, (8) compulsory courses in conservation. Under the head of Personnel and Administration came suggestions for (1) more teachers, (2) better-trained teachers, (3) closer co-operation between college and government, (4) more interdepartmental cooperation, (5) visiting lecturers, (6) more favorable attitude by college administrators. The Financial category yielded such suggestions as (1) additional funds, (2) scholarships and fellowships, (3) research grants, (4) part-time jobs for students,

and (5) governmental aid. The All Other category contained such suggestions as (1) stimulate the interest of urban people, (2) promote foreign exchange of students, (3) increase public awareness of need, (4) provide information clearinghouse, (5) increase student interest, and (6) hold more national and regional conferences.

### SUMMARY

Tables 58 and 59 present the dominant categories of response, for both schools teaching some conservation and schools teaching no conservation, in response to Questions 12, 14, 15, and 16 of the administrative questionnaire (see the Appendix). These questions dealt with the adequacy of library materials for the teaching of conservation, with the adequacy of conservation teaching in the institution, with the existence of plans for the expansion of conservation teaching, and with the sort of assistance, aids, or stimulation thought desirable or necessary to put any such plans into action. In these tables, only the dominant categories are indicated for each item and for each type of school, except for the nonteaching institutions, where the dominant category was always Not Specified, i.e., no response.

For example, from reading the table for schools teaching conservation, it may be said that on the average nearly half (47 per cent) of the administrators reporting for the 566 schools regarded their libraries as adequate for the teaching of conservation, but 44 per cent regarded the teaching of conservation in their schools as inadequate. However, two thirds reported no plans for improvement or expansion of the teaching. Of the reported plans, the most common (12 per cent) was to add new courses in which conservation would be taught. More than half (56 per cent) of the respondents believed that some assistance would be necessary to improve the conservation teaching program; of the types of assistance suggested, one third consisted of teaching aids and curricular additions or changes.

Among the nonteaching schools, one fourth (24 per cent) of the respondents regarded the library as inadequate for the teaching of conservation, and one fifth (19 per cent) branded the current situation of no conservation teaching as inadequate. However, 47 per cent reported no plans for undertaking such teaching, and virtually no plans were mentioned. Only one in 10 mentioned any need for assistance to get such a program started.

The tables suggest that the various types of institution did not vary greatly from the average. The general picture suggests that most administrators in the 458 schools teaching no conservation

TABLE 58  
DOMINANT CATEGORIES OF ADMINISTRATIVE EVALUATION OF CONSERVATION EDUCATION PROGRAMS: TEACHING SCHOOLS

Evaluation Variable	I				II		III		IV	
	All Schools	Four-Year Colleges and Small Universities			Teachers' Colleges		Junior Colleges		Special Schools	
1. Library adequacy	Adequate (47)	Adequate	(38)		Adequate	(65)	Adequate	(49)	Adequate	(53)
2. Teaching adequacy	Inadequate (44)	Inadequate	(42)		Inadequate	(41)	Inadequate	(58)	Adequate	(40)
3. Incidence of improve-ment plans	No plans (66)	Adequate	(66)		No plans	(66)	No plans	(65)	Inadequate	(40)
4. Major plan types	Add new courses (12)	Add new courses	(13)		Revise present courses	(14)	Revise present courses	(11)	Add new courses	(10)
5. Need for assistance	Assistance necessary (56)	Assistance necessary	(57)		Assistance necessary	(65)	Assistance necessary	(48)	Assistance necessary	(47)
6. Types of assistance	Teaching aids and curricula (33)	Teaching aids and curricula	(33)		Teaching aids and curricula	(26)	Teaching aids and curricula	(36)	Teaching aids and curricula	(37)
Number of schools	566	279	116	141	30					

TABLE 59  
DOMINANT CATEGORIES\* OF ADMINISTRATIVE EVALUATION OF CONSERVATION EDUCATION PROGRAMS: NONTeaching SCHOOLS

Evaluation Variable	I Four-Year Colleges and Small Universities		II Teachers' Colleges		III Junior Colleges		IV Special Schools	
	All Schools							
1. Library adequacy	Inadequate (24)	Inadequate (26)	Adequate (22)	Inadequate (22)	Inadequate (22)	Inadequate (22)	Inadequate (25)	
2. Teaching adequacy	Inadequate (19)	Inadequate (18)	Inadequate (29)	Inadequate (26)	Inadequate (26)	Adequate (17)		
3. Incidence of improvement plans	No plans (47)	No plans (43)	No plans (29)	No plans (57)	No plans (49)			
4. Major plan types	Not tabulated							
5. Need for assistance	Assistance necessary (10)	Assistance necessary (10)	Assistance necessary (7)	Assistance necessary (12)	Assistance necessary (3)			
6. Types of assistance	Not tabulated: insufficient reporting							
Number of Schools	453	250	14	125	69			

\* In all cases (except Variable 3 under Group III) the Not Specified category was dominant in all type groups, and the listed categories in the table ranked second rather than first.

were indifferent to the situation. The minority who were concerned reported no plans for improvement, and still fewer suggested any need for assistance. In the 566 schools teaching some conservation, administrators were definitely divided as to the adequacy of teaching, yet most had no plans for improvement. At least half, however, were interested in obtaining some assistance to that end, especially assistance in the form of teaching aids and curricular improvements. The Teachers' College group, already the leading type of school in conservation teaching, was most eager to obtain assistance for further improvement.

### *Teacher Evaluation of Conservation Education Programs*

In the analysis of teacher evaluations the Land-Grant and Large Universities were included as a type group, and the Special Schools were dropped as a separate group because of small numbers, although they were included in the All Teachers distribution. Data for this section were obtained from Questions 22 and 23 of the teacher questionnaire (see Appendix).

#### APPRAISAL OF SCHOOL CONSERVATION EDUCATION PROGRAM

As a first step in giving an appraisal of the strengths and weaknesses of current conservation programs at their schools, teachers were asked to make an over-all judgment along a scale of excellent to poor (Question 22, "What is your appraisal of conservation education in your institution?").

Table 60 shows that nearly 60 per cent of the teachers made such a general appraisal of school programs and that the frequency

TABLE 60  
TEACHER APPRAISAL OF CONSERVATION PROGRAMS, BY TYPE OF SCHOOL

Appraisal Category	Percentage of Teachers Reporting				
	All Teachers	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
(A) Excellent, good	26	27	17	39	21
(B) Fair, variable	33	45	30	13	36
(C) Poor, insufficient	41	28	53	48	43
Total	100	100	100	100	100
Number responding	351	110	139	44	61
Percentage responding	58	60	59	44	61

distribution was similar for all type groups, except for a relatively low response from the Teachers' Colleges. Respondents from the Land-Grant and Large Universities were apparently best satisfied with the conservation teaching in their respective institutions. Those in the Teachers' Colleges were next; although nearly half of them were definitely dissatisfied, by far the largest proportion (39 per cent) in any group believed the teaching to be good or excellent. Respondents from the Four-year Colleges and Small Universities were least satisfied, with more than half expressing dissatisfaction, and only 17 per cent judging the work to be good or excellent.

Analysis of these responses was pursued further by relating them to certain other factors of possible significance. The results are reported herewith.

*Size of School Enrollment.* The proportion of teachers appraising conservation education in their institutions as good to excellent did not bear a close or consistent relationship to school enrollment. The smallest proportion (10 per cent) was found in schools enrolling fewer than 500 students, the category which also contained the highest proportion (34 per cent) of teachers rating conservation in their schools as poor or insufficient. The percentage of respondents in the Poor, Insufficient category did vary directly by size of school, dropping as low as 18 per cent among the schools with enrollments of 2,500 or over, though there were irregular intervals between enrollment categories. In the Fair, Variable category, the percentages were about the same for all enrollment groups, except 2,500 and over, which had a definitely higher percentage than the other groups and was the only group higher than the All Teachers average. Levels of response to the question were somewhat higher in the smaller schools than in the larger ones.

*Religious Affiliation of School.* Teachers in Protestant-affiliated and Catholic-affiliated schools were much less satisfied with conservation education in their institutions than were teachers in schools having no religious affiliation. Only 4 per cent of each of these affiliated groups judged the conservation teaching in their respective institutions to be good or excellent, whereas 16 per cent of the teachers in nonaffiliated institutions gave this response. Furthermore, two fifths of the teachers from Protestant-affiliated schools reported their conservation programs as poor or insufficient, whereas only one fourth of the teachers from Catholic-affiliated schools so reported. However, a much higher proportion of the latter failed to respond to the question. In the nonaffiliated schools,



only one fifth of the teachers reported the conservation work of their institutions to be poor or insufficient.

*Major Source of School Funds.* Of the teachers returning the questionnaire, 31 per cent were in privately supported institutions, while 68 per cent were in those publicly supported. However, the percentage of response to the appraisal question was almost the same (Private 43 per cent, Public 42 per cent). Teachers reporting from the Private group showed considerably more dissatisfaction with conservation in their institutions than did those in the Public group. Thus, only 9 per cent of the teachers in privately supported institutions considered the conservation work in their respective institutions as good to excellent, as compared with 16 per cent in publicly supported schools. Conversely, 33 per cent of those in private institutions felt conservation education to be poor or insufficient, as contrasted with only 20 per cent in Public schools. The Fair, Variable category of responses accounted for 15 per cent of the respondents in Private and 22 per cent in Public schools.

The combined results of the three preceding cross-tabulations indicate that dissatisfaction with school conservation programs was greatest in Protestant-affiliated private schools with enrollments of less than 500 students, while teacher satisfaction was greatest in unaffiliated public schools with enrollments of over 500 students.

In addition to the school structural variables, teacher appraisal was also analyzed according to several teacher-attitude variables derived from the teacher questionnaire.

*Subject Area of Teacher.* Teachers in the more general subject areas (Physical Science, Social Science, Natural Science) were the least inclined to consider conservation education good to excellent in their institutions, and, except for those in Social Science, were most inclined to consider it poor or insufficient. Teachers in the more specialized areas, particularly Agriculture and Conservation, were better satisfied with current programs. Respondents in Geography, previously shown to have a high percentage of concentrated courses, had a rather even distribution between high and low appraisals, but also showed the lowest percentage of response to the question. The proportion of Teachers' College instructors reporting dissatisfaction was considerably higher than the proportion registering satisfaction.

*Teacher Interest in Conservation.* Teachers with a Strong interest in conservation were more favorably disposed toward their school programs in the subject than were those with Moderate or Slight interest. They were also more inclined to offer an appraisal.

*Resource Outlook of Teacher.* A definite relation existed between a teacher's outlook with respect to future resource shortages and his appraisal of current programs. Teachers who felt that the nation faced No Serious Shortages were more likely to be satisfied with the conservation program of the institution employing them. Most of those who felt that the future would bring Serious Shortages were dissatisfied with their programs. Thus, resource optimism and satisfaction with current resource education were likely to be found together, while pessimism and dissatisfaction were most often associated with one another.

*Specific Criticisms.* In the matter of specific comments regarding the strengths and weaknesses of institutional programs in conservation education, the Junior Colleges offered the fewest. Next came the Four-year Colleges and Small Universities. The strength factor most frequently cited was the excellence of conservation teaching in particular departments. Among the type groups, this response was most common from teachers in the Land-Grant and Large Universities, and from those in Four-year Colleges and Small Universities. It came least often from teachers in the Junior Colleges.

Only 8 per cent of all teachers specified a well-integrated over-all approach as a factor of strength in their institutions. This response was most common from the Teachers' Colleges and from the Junior Colleges. It was least common from the Four-year Colleges and Small Universities. Eight per cent of the respondents cited a good curriculum and staff as a major strength. Here the percentage of responses did not vary much from one type group to another.

Only 5 per cent of the teachers cited good extension, laboratory, or outside activities as a strong feature of the program. None of the type group percentages diverged more than one percentage point from the mean, except in the case of Teachers' Colleges, where 8 per cent of the responses were of this type.

Teachers in all type groups seemed able to point out weak points more easily than strong points in conservation education programs. The major criticism appeared to focus on excessive specialization within departments and a lack of interdepartmental co-operation. This type of weakness was cited by 18 per cent of all teachers. Among the type groups, the Land-Grant and Large Universities and the Four-year Colleges and Small Universities were near the mean in this respect while the Teachers' Colleges and Junior Colleges offered this criticism much less often.

A second criticism, cited by 17 per cent of all teachers, was that courses reached too few students, partially because conservation

was usually an elective rather than a required subject. The response on this point came most frequently from Teachers' College instructors, a fact of some significance since it appears that these colleges already offer more required courses in conservation than any of the other types of school under consideration. Junior College teachers seemed much less concerned on this point. They had little to say, also, about limited conservation curricula, a point of some interest to other types of institution.

Ten per cent of the teachers cited narrow course treatment as a weakness. It was cited most frequently by teachers in the Junior Colleges and in the Teachers' Colleges. Only 3 per cent mentioned insufficient staff or poor staff training as a weakness. This complaint was most prevalent in Land-Grant and Large Universities (6 per cent), while none of the respondents in Junior Colleges mentioned it.

### EMPHASIS ON CONSERVATION

The preceding section has been concerned with teacher appraisal of the quality of current institutional programs of conservation education. The teachers next were requested to state whether the size and scope of the conservation programs at their institutions were adequate, or whether they felt that the programs should be expanded. Specifically, the question was stated as follows: "Is conservation receiving enough emphasis at your institution?"

In reviewing the answers to this question, it should be remembered that these teachers were persons who taught some conservation and, as their responses showed, possessed at least a moderate interest in the subject, almost to a man. Hence, it might be supposed that their responses to the above question would be rather uniformly favorable to some expansion of the work. Such was not the case, however. That considerable interest was shown in the question is evidenced by the fact that only 5 per cent of the teachers contacted failed to answer this particular question. Nevertheless, as may be seen from Table 61, only two thirds (65 per cent) of these conservation instructors declared their current programs to be insufficient, while nearly one in five (19 per cent) thought them to be sufficient. Eleven per cent declared that they did not know.

By type of school, the proportion of teachers judging their institutional programs to be sufficient varied from 24 per cent among Teachers' College instructors to 15 per cent among those located in the Four-year Colleges and Small Universities. Teachers in the Land-Grant and Large Universities ranked slightly above the mean (21 per cent) for all teachers, while those located in Junior Colleges

TABLE 61

EMPHASIS ON CONSERVATION EDUCATION IN EACH SCHOOL, BY TYPE OF SCHOOL

Emphasis Category	Percentage by Type Group				
	All Teachers	I Land-Grant and Large Universities	II 4-year Colleges and Small Universities	III Teachers' Colleges	IV Junior Colleges
Don't know	11	14	8	12	12
Sufficient	19	21	15	24	16
Insufficient	65	60	72	61	64
Not specified	5	5	5	3	8

ranked below the mean (16 per cent). It is significant that although the proportion of teachers judging their institutional programs to be insufficient varied little among the Land-Grant and Large Universities, the Teachers' Colleges, and the Junior Colleges, a considerably higher proportion (72 per cent) of teachers in the Four-year Colleges and Small Universities regarded their programs as insufficient. This is in harmony with other data previously presented. On the matter of conservation emphasis in schools with or without religious affiliation, there was the expected difference. Teachers in Protestant-affiliated schools were more inclined to judge the conservation teaching of their respective institutions as insufficient than teachers in the nonaffiliated schools. On the other hand, teachers in the Catholic-affiliated schools were less inclined to rate the conservation teaching in their institutions as insufficient than teachers in the nonaffiliated schools. The number of Catholic school teachers answering this question was small, however. In all three cases, more than half of the teachers believed the conservation teaching to be insufficient.

With respect to the subject-matter areas represented by the teachers, certain variations in response to the question of curricular emphasis were noted. Nearly one third of the teachers of Social Science did not answer the question, and more than one in five of the teachers in the fields of Physical Science and Agriculture also made no response. All other teaching fields represented answered in considerably higher proportion. From 14 to 21 per cent of all teachers responding, except those teaching in the field of conservation itself, believed the current programs in conservation education in their respective institutions to be sufficient. Of the teachers in the field of conservation, one third thought their current

programs were sufficiently developed. The modal reaction, however, was that current teaching programs were insufficiently developed. From 53 to 70 per cent of the teachers so responded, the variation being associated with their field of interest.

### TEACHER SUGGESTIONS FOR IMPROVEMENT

In response to a request for suggestions bearing upon the improvement of the conservation education programs of the institutions represented, a large number of specific remedies were proposed by 57 per cent of the teacher-respondents. The most frequent of these suggestions, offered by 18 per cent of the teachers, was improvement of existing courses and attainment of better interdepartmental co-operation. This type of improvement was mentioned most frequently by teachers in the Teachers' Colleges (23 per cent) and least frequently by those in Land-Grant and Large Universities (16 per cent). Eleven per cent of all teachers suggested each of the following types of improvement: (1) new courses and programs in conservation, (2) required conservation courses, and (3) better training and awareness of conservation among teachers. Among the type groups, respondents in Land-Grant and Large Universities showed the greatest interest in new courses and programs (14 per cent), while those in Junior Colleges and Teachers' Colleges showed less interest (8 and 9 per cent, respectively). Advocates of required conservation courses were strongest in Teachers' Colleges (17 per cent) and weakest in Junior Colleges (5 per cent). Ten to 12 per cent in each type group advocated better training and conservation awareness of teachers. Six per cent of all teachers cited increased publicity and student interest as desirable improvements.

There is a considerable correspondence between the suggestions for improvement listed here and the weaknesses previously outlined. Thus the excessive specialization by departments and lack of integration reported under "weaknesses" would be corrected by the most often suggested "improvement" cited above. Likewise, the elective "weakness" of conservation would be remedied by the proposal to make conservation a compulsory subject. However, among the type groups there was often a lack of relationship between ascribed weaknesses and suggested improvements. For example, Junior College teachers offered practically no criticism of staff training in conservation subjects, yet increased training and conservation awareness among teachers ranked second in the list of suggested improvements offered by this group. Another instance is found in the Teachers' College group, where lack of integration was not especially prominent as an ascribed weakness, although

greater integration was emphasized strongly as a suggested improvement. The reverse of this was true for Land-Grant and Large Universities teachers, whose concern about excessive departmental specialization seemed relatively stronger than their desire to counteract it. However, despite these inconsistencies within particular type groups, the kinds of criticism bore a recognizable relationship to the improvement measures suggested. The proportion of teachers responding, by type group, held fairly constant for both criticisms and suggested improvements.

When the teachers addressed themselves to the question concerning what an outside agency with resources and an interest in promoting more and better conservation teaching could do to help, a considerable majority offered one or more suggestions. This question served in some measure to separate suggestions for improvement that must, or might well be, put in operation by the college itself from those remedies which were thought to go beyond the resources of the local institution.

One fifth to one fourth of the teachers, according to the type group, made no suggestions that they felt might need outside assistance for realization. Those who offered such suggestions most frequently mentioned Visual Aids. This category came particularly frequently from Junior College teachers, receiving 37 per cent of all mentions, and least frequently from teachers in Land-Grant and Large Universities, where it received but 15 per cent of all mentions. The addition of more Courses and Workshops, a measure presumably expected to require additions to the teaching staff, received 15 per cent of all mentions, the highest percentage coming from Teachers' Colleges (29 per cent), and the lowest percentage from the Land-Grant and Large Universities (7 per cent). A need for more Conservation Literature received most frequent mention by teachers in Junior Colleges (22 per cent), and least frequent mention by those in the Land-Grant and Large Universities (8 per cent). Lecturers and visiting experts as assistance were cited with about the same degree of frequency in all type groups. Assistance simply in terms of Funds was mentioned most frequently by teachers in Four-year Colleges and Small Universities (16 per cent), and least frequently by those in Junior Colleges (3 per cent). Research Support and Scholarships came most often from Land-Grant and Large Universities, about one in six, and least often from Junior Colleges.

On the basis of school enrollment some variation also occurred. Teachers in schools with fewer than 500 students enrolled offered suggestions for assistance similar to those that were suggested by

teachers in Junior Colleges. Teachers in schools with enrollments of 2,500 or more offered suggestions for assistance similar to those emanating from the Land-Grant and Large Universities. These and other comparisons lead to the inference that teacher suggestions for outside assistance with conservation teaching programs varied somewhat according to the type of institution that the respondent represented.

### SUMMARY

The analysis presented in this chapter indicates that the teacher respondents were decidedly critical of current conservation programs in their schools. The main focus of their criticism was the lack of co-ordination among the departments teaching conservation. Whether this tendency toward department autonomy was due to professional or to administrative considerations was not determined. It was present in all types of schools, though least in evidence in the Junior Colleges. It may be noted that while lack of integration was the most frequent criticism, the excellence of conservation teaching in particular departments was cited most often as a factor of strength.

Teachers in the Land-Grant and Large Universities were least critical of school programs, while those in Four-year Colleges and Small Universities were most critical. The Teachers' College group was the one that felt most keenly that the elective nature of conservation education is a major weakness of current programs. Yet this was the group that possessed the most experience with required courses. Apparently these teachers felt that this trend toward compulsory work in conservation should be extended. Junior College teachers were close to the All Teachers profile for most variables. However, these teachers mentioned an integrated and well-balanced program of conservation teaching as a strength more frequently than the occurrence of good teaching in particular departments. But regardless of differences among type groups, the problems of securing better co-ordination of conservation education work within the school seemed to be the chief concern of teachers.

The kinds of outside assistance desired appeared to mirror the more prominent activities of the type groups of schools. Although, as a suggestion for assistance, Visual Aids prevailed in the All Teachers distribution, it was much less important among the suggestions offered by teachers in the Land-Grant and Large Universities. In these schools, Research Support and Scholarships were the types of assistance most desired. It has been noted that these schools are more committed to research functions than any of the

other school types. Teachers' Colleges have been shown to have the largest proportionate number of concentrated conservation courses of any school type, yet teachers in this group ranked More Courses as the type of outside assistance most desired. The foregoing facts suggest that an elaboration of existing strengths rather than the elimination of known weaknesses was the main objective of many teachers.

Only to a limited extent was it possible to compare the evaluations of conservation teaching programs made by the school administrators with the evaluations made by the teachers from the same schools. Administrative evaluations were not obtained from the Land-Grant and Large Universities, and the questions answered by administrators and teachers in other types of institution were not identical. However, certain similarities and differences may be pointed out. In the first place conservation teachers in the Four-year Colleges and Small Universities were definitely more critical of their school programs in conservation education than were the administrative respondents in the same institutions. To a lesser degree, the teachers were more critical in the Teachers' Colleges. The evaluations of the two groups were nearly equal in the Junior Colleges.

Teachers and administrators differed most in their evaluations in the small schools, and the difference between the two groups decreased as the size of the school increased.

Teachers' evaluations of conservation teaching programs were definitely lower than those of their administrators in schools with religious affiliation. In nonaffiliated schools these evaluations were rather similar. In the same way, teachers in privately supported schools were more critical than their administrators, but in publicly supported schools there was little difference between teacher and administrator evaluations.

When teacher suggestions for outside assistance were compared with similar suggestions offered by administrators, certain differences were noted. In the first place, a higher proportion of teachers answered the question than of administrative officers in the same institutions. In the second place, teachers emphasized financial aid more, while administrators placed more emphasis upon assistance with personnel and administrative problems. (This latter, of course, involved finances to some degree.) However, both administrators and teachers placed primary emphasis upon the need for assistance with teaching aids and curricula. All other considerations were secondary.



Variations occurred among both teacher and administrator suggestions when considered from the standpoint of type of institutions represented. Although both teachers and administrators in all types of school were primarily interested in obtaining assistance with teaching aids and curricular problems, teachers were more emphatic than administrators in expressing this need. This was true of all teachers except those in the Land-Grant and Large Universities, who were about equally concerned with getting funds. They wanted money to do research with the facilities already at hand. Other types of school were more interested in obtaining facilities and adding new courses to the curriculum. Teachers in the Junior Colleges, most of all, were interested in obtaining facilities and personnel, and in adding new courses.

By and large, the patterns of suggestions for outside assistance by teachers and administrators were similar within the same type of institutional group, though with differences in emphasis. Although both agreed that their first need was for assistance with teaching aids and curricular problems, teachers placed their second emphasis upon financial assistance *per se*, while administrators emphasized personnel and administrative needs, a category which included financial problems only indirectly, if at all.

# 9

## PROGRAM LEVELS

### *Purpose and Procedure*

In Chapter 5, an analysis of the programs of conservation education of 1,116 colleges and universities was presented. These included 1,024 colleges and small universities in which the analysis was based upon the data supplied by college administrators in the respective institutions. Also included was a group of 92 institutions composed of land-grant colleges and universities plus some large nonland-grant universities. The data for this group were supplied by the institutional catalogues.

The conservation education programs of these colleges and universities were analyzed with respect to their internal characteristics, against a background of such factors as type of school, geographic location, size of place where located, source of funds, size of enrollment, and other similar characteristics. The results provide a good basis for understanding the variability of these programs among the institutions of higher learning in the United States. However, such a presentation necessarily fragments the various institutions involved in the analysis so that an integrated view of their functioning at any particular level of performance is not readily obtainable. This chapter presents a more integrated view of the institutions now teaching courses in conservation.

To divide these institutions into groups offering similar programs in conservation education, it is necessary first to distinguish certain levels of performance, in order to segregate schools functioning at a relatively high level from those functioning at a relatively low level in conservation education. In order to do this, the answers to Questions 6-13 of the administrative questionnaire were used.<sup>1</sup> These questions asked: what aspects of conservation were taught,

<sup>1</sup> Since this questionnaire was not sent to the land-grant and other large universities, they were not included in the analysis presented in this chapter.

and in what departments or subject-matter areas; whether a major or special degree in conservation was offered; how conservation education was organized into courses; what was the number of persons teaching conservation, and the number with special training for the job; what types of teaching aids were used; whether extension courses in conservation education were offered; and whether the institutional library was adequate for conservation teaching.

In terms of these data the 1,024 colleges and universities answering the administrative questionnaire were already differentiated into three groups, namely, those professing to no program in conservation education (458 in number), those offering such a program but failing to answer fully all eight of the questions involved in the differentiation procedure (176), and those offering a program in conservation education which also returned full answers to all the questions above (390).

The general characteristics of those schools which offered no work in conservation education were set forth in Chapter 5. Since by virtually any system of classification based on performance they would be grouped together in the zero class, they will not be discussed here. By a series of tests, it was noted that in some respects the group of 176 institutions that did not fully answer Questions 6-13 appeared to be markedly different from the group of 390 institutions that did so. To a much higher degree this group was composed of privately supported schools with enrollments of fewer than 500 students. Also, the high proportion of returns in which one or more questions was not answered, or answered with a "Don't know," suggested that the data supplied might not be sufficiently reliable for the purpose at hand. Consequently, this group was abandoned, and attention was centered entirely upon the 390 institutions giving complete returns.

With the data supplied by these 390 institutions, it would have been possible to develop a statistical index and apply it to all the schools, giving each of them a rating on a continuum of 0 to 100. However, the authors felt that the available data did not justify such refinement, and furthermore, in view of the purpose at hand, the amount of effort required was scarcely justified. The range of performance expressed in terms of the answers to Questions 6-13 was such that a person well informed concerning programs in conservation could upon inspection of the schedules sort them into three (or perhaps four) groups approximately exemplifying different levels of performance. However, several trials of this sort made it evident that since eight questions were involved in the judgment, successive trials by the same person involved some error. Conse-

quently, five persons representing as many different subject-matter fields,<sup>2</sup> each long familiar with programs of conservation education, were asked independently to rank the eight questions in the order of what they considered their relative importance in differentiating conservation programs. These rankings, which were highly intercorrelated, were used to develop differential weights for each of the 8 questions used in the differentiation process. After adjusting the weights to a scale, 0 to 100, the 390 institutions were scored for the 8 questions involved and a summary score for each institution was obtained. The 390 institutions consisted of 197 four-year colleges and universities, 85 teachers' colleges, and 108 junior colleges.

Since the "score" marks thus obtained are based upon nothing more than the administrative data supplied by the questionnaire,<sup>3</sup> any inference that the individual scores tend to place each institution reliably in a 0 to 100 continuum would not be justified. Many more data concerning each institution would be necessary for such a ranking. However, the authors believe that for creating three subgroups among the 390 institutions in order to study certain limited characteristics, the procedure is justifiable.

When completed, the numerical scores of the 390 institutions ranged from 11 to 79 with a median of 36.7. Four-year colleges and small universities had scores ranging from 11 to 79 with a median of 34.9. Teachers' college scores ranged from 15 to 78 with a median of 44.8, and the junior college scores from 11 to 58 with a median of 43.0. Thus, the range of scores for the two types of four-year colleges were very similar, but that of the junior colleges was much narrower, as might be expected (see Table 62).

As previously stated, visits to a number of the institutions for checking the accuracy of the questionnaire returns showed them to be substantially correct as far as they went. It appeared from these interviews, however, that if the questionnaire had been more extensive, the differentiation would probably have been wider, though not necessarily different as to relative placements. This statement is based on the conclusion that, on the questionnaire, the position of the schools with the better programs tended to be understated while that of the schools with the poorer programs tended to be overstated. Thus, the distance between them is

<sup>2</sup> One was a forester, one a zoologist and wildlife specialist, one a geographer, one an economist, and one a sociologist.

<sup>3</sup> These data were assumed to be substantially correct. Subsequent visits to several of the schools involved, at which time the returned schedules were checked for accuracy, suggest that the assumption was justified.

TABLE 62  
DISTRIBUTION OF SCHOOLS BY SCORE, BY TYPE OF SCHOOL

Score	Total		Four-Year Colleges		Teachers' Colleges		Junior Colleges	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Total	390	100	197	100	85	100	108	100
10-19	34	9	19	10	3	4	12	11
20-29	85	22	52	26	7	8	26	24
30-39	112	29	55	28	18	21	39	36
40-49	86	22	37	19	30	35	19	18
50-59	57	14	27	14	18	21	12	11
60-69	9	2	3	1	6	7	—	—
70 and over	7	2	4	2	3	4	—	—
Under 30	119	30	71	36	10	12	38	35
30-49	198	51	92	47	48	56	58	54
50 and over	73	19	34	17	27	32	12	11
Median	36.7	—	34.9	—	44.8	—	34.0	—

perhaps greater than the distribution in Table 62 indicates. However, on a scale of 0 to 100 the differentiation could not have been widened as much as 30 points, since none could be scored zero, and probably none would be scored 100.

For the analysis under discussion here, the distribution of scores was broken into three parts. Because of the nature of the distribution and the manner in which it was to be used, it seemed better to place the cutting points at certain breaks in the series rather than to employ the more formal technique of dividing it into terciles or quartiles. As may be seen in Table 62, 51 per cent of the scores fell within the range 30-39. These were labeled "Medium." The 30 per cent falling below 30 were called "Low," and the 19 per cent whose scores were 50 or above were labeled "High." From here on, these categories will be used in the analysis.

On succeeding pages occur, first, an analysis of the relation of the component parts of the scoring device to the total institutional score; second, the relation of the total score to certain institutional backgrounds; and third, a presentation of certain qualitative data bearing upon the outlook for improving the programs of conservation education at these different levels of development. Finally, there is a brief description of the chief characteristics of each of the three score groups, Low, Medium, and High.

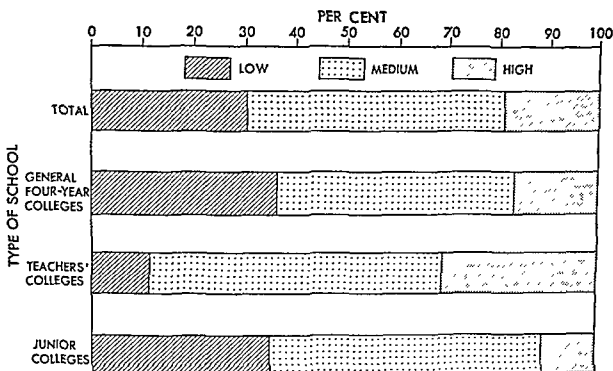


FIGURE 7. Percentage of schools in each score group, by type of school.

### *Relation of Component Parts to Institutional Score*

By showing how the proportion of schools scoring Low, Medium, and High changes as the component under analysis changes, it will be shown in this section how each of the eight components used to make up the total institutional score is related to that score.

#### ASPECTS OF CONSERVATION TAUGHT

Of the nine specific aspects of conservation reported by the 390 institutions scored, soils, offered by 68 per cent of all schools, ranked first in number of schools giving it attention. It was closely followed in frequency by minerals, water, forests, wildlife, and ecology. Oceanography and range management were offered by only 20 per cent and 17 per cent of the schools respectively (see Table 63). This order of frequency differs a bit from that in Chapter 3, which was based upon all 566 schools teaching some conservation, but the deviation is slight.

The institutional scores were related to the offering of specific aspects of conservation, in the sense of being somewhat correlated with the preferential list, indicated in Table 63. If a school offers only one aspect of conservation, it is likely to be soils or minerals, except among the Teachers' Colleges, where it is likely to be minerals or water. Following the usual first aspect come water and

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40-49	86	22	37	19	30	35	19	18
50-59	57	14	27	14	18	21	12	11
60-69	9	2	3	1	6	7	—	—
70 and over	7	2	4	2	3	4	—	—
Under 30	119	30	71	36	10	12	38	35
30-49	198	51	92	47	48	56	58	54
50 and over	73	19	34	17	27	32	12	11
Median	36.7	—	34.9	—	44.8	—	34.0	—

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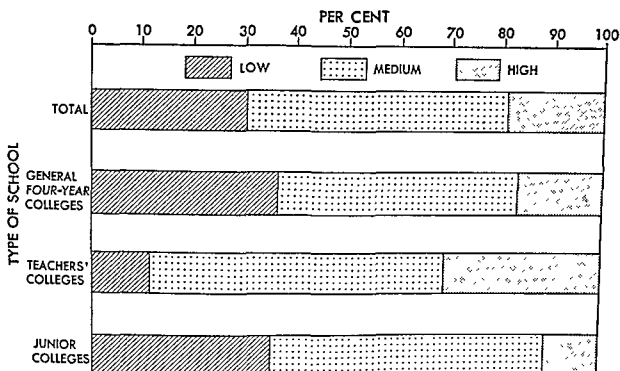


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TABLE 63

SCHOOLS CLASSIFIED BY NUMBER AND PERCENTAGE TEACHING SPECIFIED ASPECTS OF CONSERVATION, BY TYPE OF SCHOOL

Aspect of Conser- vation Taught	Total		Four-year Colleges		Teachers' Colleges		Junior Colleges	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Total	390	100	197	100	85	100	108	100
Soils	267	68	136	69	58	68	73	68
Minerals	258	66	136	69	65	76	57	53
Water	238	61	108	55	62	73	68	63
Forests	222	57	100	51	56	66	66	61
Wildlife	216	55	104	53	58	68	54	50
Ecology	158	41	89	45	45	53	24	22
Recreation	118	30	58	29	31	36	29	27
Oceanography	78	20	65	33	8	9	5	5
Range man- agement	66	17	30	15	15	18	21	19
Other	101	26	89	45	9	11	3	3
Mean	4.4	—	4.7	—	4.3	—	3.7	—

forests. Of the nine aspects listed, the least likely to be given are oceanography and range management. This, of course, represents the average for all types of schools and may not be rigidly applied to a particular type of school or in a specific regional area. It does suggest, however, that the schools with but one or two teachers of conservation are likely to be found teaching some combination of soils, minerals, water, and forests, the first four subjects in the preferential list.

With these relationships in mind it is not surprising to find that the institutional scores tend to rise as one goes down the preferential list of conservation aspects taught. Thus, schools teaching soils, minerals, and water are likely to score lower than those teaching recreation, oceanography, and range management. The reason is that of those institutions teaching soils, minerals, and water a fairly high proportion is likely to be teaching nothing else, while only those institutions with a fairly ambitious conservation education program are likely to be found offering oceanography and range management, unless they happen to be located in an area where it is strategic to offer these topics at an early stage in the development of their program.

The total number of aspects of conservation taught is also related to score. The number of different conservation aspects offered in the curriculum bears some direct relation to the number of teachers

teaching the subject. (The number of teachers of conservation is in turn directly related to the size of the school, measured in terms of enrollment. This does not mean, however, that all large schools offer a program in conservation education. And furthermore, since the number of aspects taught represents a differential component of the scoring device, it may be expected to be positively correlated with the total institutional score (see Table 64). Institu-

TABLE 64

SCHOOLS CLASSIFIED BY NUMBER OF CONSERVATION ASPECTS TAUGHT, AND BY PERCENTAGE DISTRIBUTION OF SCORES\*

Number of Aspects Taught	Total		Total		Low Score		Medium Score		High Score	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Total	390	100	390	100	119	30	198	51	73	19
One	33	7	33	100	23	70	9	27	1	3
Two	33	8	33	100	24	73	9	27	0	—
Three	29	7	29	100	12	41	17	59	0	—
Four	45	12	45	100	16	36	25	55	4	9
Five	64	16	64	100	19	30	38	59	7	11
Six	89	23	89	100	19	21	57	64	13	15
Seven	49	13	49	100	4	8	26	53	19	39
Eight	36	9	36	100	1	3	12	33	23	64
Nine	12	3	12	100	1	8	5	42	6	50

\* See explanation of the scoring method, earlier in this chapter.

tions teaching but one, two, or three aspects of conservation placed 3 per cent in the High score group and 62 per cent in the Low score group. On the other hand, schools teaching 7 to 9 aspects of conservation placed 49 per cent in the High score group and only 6 per cent in the Low score group.

#### SUBJECT-MATTER FIELDS INVOLVED

The number of subject-matter fields, teaching fields, or fields of learning involved in the teaching of conservation among the colleges and universities surveyed has been set forth, for all schools surveyed, in Chapter 5. The order of importance, in the sense of frequency of involvement, listed there, holds also for the 390 institutions scored. In descending order of frequency, it is (1) natural science, (2) physical science, (3) geography, (4) social science, (5) agricultural science, (6) physical education, (7) education, and (8) business. These subject-matter areas may or may not be identical with departments. Among the schools under consideration, there were many more departments than subject areas.

With respect to score, this same order of teaching-field involvement held substantially for all three score groups, i.e., Low, Medium, and High. The only variations were that (1) among the Teachers' Colleges, education changed places with agricultural science in all three score groups; in the Low score group education stood in fourth place, above geography; (2) among the Junior Colleges, where education and geography as teaching areas are less common than among the Four-year institutions, the social science and agricultural science fields tended to rank next after natural and physical science.

### SPECIAL DEGREE IN CONSERVATION

Only 7 of the 390 institutions scored offered a special degree in conservation. Two of these were among the Four-year Colleges; 2 were Teachers' Colleges, and 3 were Junior Colleges. Those in the first group scored High; one of the two Teachers' Colleges scored in the High and the other in the Medium group; the three Junior Colleges placed two in the High and one in the Medium group. Thus, none of the seven schools scored Low.

### UNDERGRADUATE MAJOR OFFERED

Of the 390 schools scored, 93 per cent offered no undergraduate major in conservation. (none offered a minor.) Of the 27 offering a major, 2 scored Low, 10 scored Medium, and 15 scored High. Hence, it is clear that only the relatively high-scoring schools offered an undergraduate major in conservation.

The patterns of distribution by score were similar for all three types of school. Of the 13 Four-year Colleges and Small Universities offering an undergraduate major in conservation, one scored in the Low group, 4 in the Medium, and 8 in the High. Of the 6 Teachers' Colleges offering an undergraduate major, 2 scored in the Medium group and 4 in the High group. The 8 Junior Colleges offering a major placed 4 in the Medium group, 3 in the High group, and one in the Low score group. Thus, only one school scoring Low offered an undergraduate major in conservation, and it was a Junior College.

### COURSE ORGANIZATION OF CONSERVATION EDUCATION

Among the 390 institutions scored, the most common method of presenting the subject of conservation was to include it in courses in certain more or less related fields, such as physical or biological science and geography. Forty-nine per cent of all schools offered only such "integrated courses," while a total of 16 per cent of the

institutions offered only special courses in conservation. A total of 35 per cent offered both special and integrated courses.

Apparently those schools that integrated conservation into related courses were more successful in their programs of conservation education than those offering only special courses, since only one of the 63 schools in the latter category scored in the High group, as opposed to 19 per cent of all schools, while 7 of them scored in the Low group.

With respect to type of school, it may be noted from Table 65 that all three types followed the general average closely. That is to say, the schools offering conservation through special courses only, or integrated courses only, had similar scores, which were relatively Low. Those institutions offering the work through both special and integrated courses scored above the general average. It is

TABLE 65

SCHOOLS CLASSIFIED BY TYPE AND SPECIFIED METHODS OF OFFERING CONSERVATION,  
AND BY PERCENTAGE DISTRIBUTION OF SCORES

Type of School	Total		Total		Score		
	Number	Per Cent	Number	Per Cent	Low Per Cent	Medium Per Cent	High Per Cent
All colleges: <sup>1</sup>							
Total	390	100	390	100	30	51	19
Special courses only	63	16	63	100	44	54	2
Integrated courses only	191	49	191	100	43	47	10
Both special and integrated courses	136	35	136	100	6	55	39
Four-Year colleges and universities:							
Total	197	100	197	100	36	47	17
Special courses only	36	18	36	100	50	47	3
Integrated courses only	87	44	87	100	52	40	8
Both special and integrated courses	74	38	74	100	11	54	35
Teachers' Colleges:							
Total	85	100	85	100	12	56	32
Special courses only	14	16	14	100	21	79	—
Integrated courses only	27	32	27	100	26	56	18
Both special and integrated courses	44	52	44	100	—	50	50
Junior colleges:							
Total	108	100	108	100	35	54	11
Special courses only	13	12	13	100	54	46	—
Integrated courses only	77	71	77	100	39	52	9
Both special and integrated courses	18	17	18	100	6	67	27

worthy of mention that the Teachers' Colleges and the Junior Colleges offering conservation only through special courses failed to place a single school in the High score group.

Thus, it appears that those institutions with the work in conservation organized either in special courses only or in integrated courses only tend to have the simplest programs. Schools with the work organized in both special and integrated courses are very likely to have programs that are considerably more elaborate in nature.

### NUMBER OF PERSONS TEACHING CONSERVATION

The number of persons teaching conservation represents a significant datum in any attempt to differentiate educational institutions with respect to their conservation programs. When taken alone, however, it does not represent an adequate index of the scope of the institutional program in conservation education, because of the many possible methods of organizing and offering the subject in the curriculum. Special conservation courses may be either extensive or intensive in their coverage with respect to the various aspects of the subject, such as water, soil, minerals, etc. Also, the subject may be offered as an integrated topic in a few or many courses, the major objective of which is not education in conservation. Again, the number of teachers of conservation may be concentrated in one or two subject-matter departments, thereby limiting the number of aspects of conservation covered and consequently the number of teachers necessary, or the courses and teachers may be scattered throughout a number of departments, thus contributing both to the number of teachers and to the variety of conservation aspects taught.

The number of schools with specified numbers of persons teaching conservation is set forth in Table 66. The median number ranged from 2.2 in the Junior Colleges to 3.1 in the Teachers' Colleges. The median for all 390 schools was 2.4. Sixty-three per cent of all schools had one but not more than three teachers of conservation; 17 per cent had six or more. The Four-year Colleges and Small Universities had virtually the same distribution as all schools, but the Teachers' Colleges and Junior Colleges differed. Of the Teachers' Colleges only 49 per cent had one to three teachers, and 21 per cent had six or more. On the other hand, the Junior Colleges had 66 per cent with one to three teachers and only 15 per cent with six or more. Thus, on the average, the Teachers' Colleges employed the largest number of teachers in their programs of conservation education, the Four-year Colleges and Small Universities

TABLE 66

PERCENTAGE OF SCHOOLS WITH SPECIFIED NUMBER OF PERSONS TEACHING CONSERVATION, BY TYPE OF SCHOOL

Number of Persons Teaching Conservation	Total		Four-Year Colleges	Teachers' Colleges	Junior Colleges
	Number	Per Cent	Per Cent	Per Cent	Per Cent
Total	390	100	100	100	100
One	67	17	19	10	18
Two	93	24	23	19	30
Three	86	22	25	20	18
Four	44	11	8	18	11
Five	33	9	7	12	8
Six	24	6	6	12	10
Seven or more	43	11	12	9	5
Median	—	2.4	2.3	3.1	2.2

employed a smaller number, and the Junior Colleges employed the fewest of all.

Clearly, the number of teachers was directly related to the score of the institution, for as the number of teachers of conservation increased, the score of the institution also tended to increase. Schools with only one teacher placed 60 per cent of their number in the Low score group and none in the High score group. On the other hand, institutions with four or more teachers of conservation placed less than 10 per cent of this number in the Low score group and 42 per cent in the High score group. These results were consistent for all types of school, with moderate variation. The Four-year Colleges and Small Universities placed no school having less than three teachers of conservation in the High score group, and the Junior Colleges placed no school with less than four teachers in the High score group (see Table 67).

### TEACHING AIDS

The most commonly used teaching aids among the four inquired about were visual aids and field trips. Ninety per cent of the 390 institutions scored reported using the former and 89 per cent the latter in teaching their courses in conservation. Special laboratory work and visiting lecturers were much less used. Fifty-six per cent of the schools reported using the former, but only 50 per cent obtained visiting lecturers to assist in the teaching of conservation. Only 1 per cent of the schools used none of the four aids to teaching. The three types of school did not vary greatly from the general

TABLE 67

SCHOOLS CLASSIFIED BY NUMBER OF PERSONS TEACHING CONSERVATION, AND BY PERCENTAGE DISTRIBUTION OF SCORES\*

Number of Persons Teaching Conservation	Total		Total		Score		
	Number	Per Cent	Number	Per Cent	Low Per Cent	Medium Per Cent	High Per Cent
Total	390	100	390	100	30	51	19
One	67	17	67	100	60	40	0
Two or three	179	46	179	100	38	54	8
Four or five	77	20	77	100	9	57	34
Six or over	67	17	67	100	6	42	52

\* See explanation of the scoring method, earlier in this chapter.

average. The Four-year Colleges and Small Universities ran from 2 to 4 per cent lower than the average for all three types of schools, but varied in exactly the same manner in the use of each of the types of teaching aids. Two colleges used none of these aids. Teachers' Colleges ran considerably higher than the average for all schools. In this group 99 per cent used visual aids; 94 per cent used field trips; 68 per cent employed special laboratory work, and 65 per cent brought visiting lecturers to the classroom. No school was without one or more of these aids. The Junior Colleges also provided a record very close to the general average, being as much as 6 per cent low in only one item, namely the use of visiting lecturers. Only one Junior College reported using none of these teaching aids.

The difference between using visual aids and field trips in teaching conservation was nondiscriminatory in terms of score, as virtually the same schools used both. Those schools using special laboratory work and visiting lecturers generally had better developed conservation programs and were likely also to use visual aids and field trips. They scored distinctly higher than schools not using special laboratory and visiting lecturers. This conclusion holds not only for the total but for all three types of schools (see Table 68).

### LIBRARY ADEQUACY

For this analysis, the replies to the inquiry about library adequacy for the teaching of conservation were tabulated in four categories. A few more than half (52 per cent) of the respondents judged their libraries to be adequate for the purpose. An additional 19 per cent gave an affirmative answer with certain conditions

TABLE 68

SCHOOLS CLASSIFIED BY USE OF SPECIFIED AIDS TO TEACHING CONSERVATION, AND BY PERCENTAGE DISTRIBUTION OF SCORES

Teaching Aids Used	Total		Total		Score		
	Number	Per Cent	Number	Per Cent	Low Per Cent	Medium Per Cent	High Per Cent
Total	390	100	390	100	30	51	19
Visual aids	350	90	350	100	27	53	20
Field trips	347	89	347	100	26	54	20
Special laboratory	217	56	217	100	21	52	27
Visiting lecturers	194	50	194	100	15	56	29
None	4	1	4	100	50	50	—

attached, such as "Yes, in certain respects." More than one fourth (27 per cent) stated that their library was not adequate for the teaching of conservation, and two per cent admitted they did not know. This pattern of replies was followed closely by the Four-year Colleges and Small Universities. Among them, the proportion giving a negative reply was 30 per cent. In the case of the Teachers' Colleges, the proportion returning an unqualified "Yes" rose to 67 per cent, and the conditional "Yes" and negative "No" were accordingly low. Only 15 per cent felt that their libraries were not sufficiently equipped for conservation teaching. The responses from Junior Colleges followed closely the pattern of all colleges although there were relatively fewer conditional replies (see Table 69). Based upon score, there was a sharp distinction between the schools according to the way they responded to the library inquiry. Schools claiming adequate library facilities scored significantly above aver-

TABLE 69

SCHOOLS CLASSIFIED BY REPORTED ADEQUACY OF LIBRARY FOR CONSERVATION TEACHING, AND BY PERCENTAGE DISTRIBUTION OF SCORES

Library Condition	Total		Total		Score		
	Number	Per Cent	Number	Per Cent	Low Per Cent	Medium Per Cent	High Per Cent
Total	390	100	390	100	30	51	19
Adequate	203	52	203	100	10	53	32
Adequate, with qualifications	75	19	75	100	29	60	11
Not adequate	103	27	103	100	70	29	1
Condition not known	9	2	9	100	44	56	—



age, and those returning conditional or negative replies scored distinctly below the average. Those claiming adequate facilities placed 32 per cent in the High group and only 10 per cent in the Low. By contrast, those denying adequate library facilities placed only one per cent in the High group and 70 per cent in the Low.

There was even greater contrast among the scores of the Four-year Colleges and Small Universities as regards library adequacy. Those schools reporting adequate library facilities for teaching conservation placed 34 per cent in the High score group and 13 per cent in the Low, whereas those colleges reporting inadequate library facilities placed none in the High score group and 72 per cent in the Low. The Teachers' Colleges followed the pattern of the general average but on a higher scoring level. The one school reporting inadequate library facilities but scoring in the High group was a Teachers' College. This is what might be expected in view of other score comparisons. Junior Colleges also followed the general pattern. In all three types of schools, the group returning a report of adequacy with reservations scored intermediate between the group reporting adequate facilities and the one reporting inadequate facilities.

### EXTENSION WORK

Of the 390 institutions scored, 29 per cent offered some sort of conservation education other than that given in the regular courses for full-time resident students. Such work took a variety of forms. There were evening courses, special summer courses, and short courses for professional workers. There were conferences and workshops, extension courses, and correspondence courses; and there were combinations of these.

Of the 113 institutions offering some extension work in conservation, 8 per cent scored Low, 52 per cent Medium, and 40 per cent High. The 277 schools offering no extension work in this subject placed 40 per cent in the Low group, 50 per cent in the Medium, and 10 per cent in the High (see Table 70).

The score placements were consistent for the three types of institutions. Among the Four-year Colleges and Small Universities, 24 per cent offered some extension work and 76 per cent offered none. Of the former, 13 per cent scored Low, 49 per cent Medium, and 38 per cent High. Of the latter, 43 per cent scored Low, 46 per cent Medium, and 11 per cent High.

The Teachers' Colleges scored a bit higher. Of the 47 offering some extension work in conservation education, 2 per cent scored Low, 53 per cent Medium, and 45 per cent High. But of the 38

TABLE 70

SCHOOLS CLASSIFIED BY TYPE AND OFFER OF EXTENSION WORK IN CONSERVATION EDUCATION, AND BY PERCENTAGE DISTRIBUTION OF SCORES\*

Type of School	Total		Total		Score		
	Number	Per Cent	Number	Per Cent	Low Per Cent	Medium Per Cent	High Per Cent
All colleges:							
Total	390	100	390	100	30	51	19
Extension work offered	113	29	113	100	8	52	40
No extension work offered	277	71	277	100	40	50	10
Four-Year Colleges:							
Total	197	100	197	100	36	47	17
Extension work offered	47	24	47	100	13	49	38
No extension work offered	150	76	150	100	43	46	11
Teachers' Colleges:							
Total	85	100	85	100	12	56	32
Extension work offered	47	55	47	100	2	53	45
No extension work offered	38	45	38	100	24	60	16
Junior Colleges:							
Total	108	100	108	100	35	54	11
Extension work offered	19	18	19	100	10	58	32
No extension work offered	89	82	89	100	40	53	7

\* See explanation of the scoring method, earlier in this chapter.

schools offering no extension work in this subject, 24 per cent scored Low, 61 per cent Medium, and 16 per cent High.

The Junior Colleges had the smallest proportion (18 per cent) offering any extension work in conservation, and of the three types of schools they scored lowest. Of the 19 schools offering some extension education in conservation, 10 per cent scored Low; 58 per cent scored Medium, and 32 per cent scored High. And of the 89 schools offering no extension work, 40 per cent scored Low, 53 per cent Medium, and 7 per cent High.

Thus, we see that the Teachers' Colleges included the highest proportion of schools offering extension education in conservation, while the Junior Colleges had the lowest. Likewise, the Teachers' Colleges offering extension work scored highest and the Junior Colleges lowest among those schools offering extension education in this subject. So far as scoring is concerned, the contrast

between those schools offering extension work and those offering none was considerable. In fact, when the scores were characterized as Low, Medium, or High, the proportions of the two groups falling into each category were almost the reverse of each other.

### SUMMARY RESULTS OF SCORING

In the preceding pages the eight components of the scoring device herein used have been examined in relation to the total institutional score. The results make it clear that the device not only differentiated the institutions scored in terms of their total programs of conservation education but also in terms of each of the components involved in the scoring device itself. Variation in each of the eight components of the device has showed a discernible relationship to the total score, which is as it should be, considering the techniques used.

It should, of course, be remembered that the scoring device used represents a particular set of values, namely, the values of the five experts who contributed to its formulation. Other groups might develop a similar device representing a somewhat different combination of values. However, the authors of this study believe that if the device were developed by a similar group of experts and used to differentiate the same body of data used in the analysis presented here, the results obtained would be highly correlated with the findings herein presented.

### *Relation of Institutional Score to Certain Background Factors*

#### GEOGRAPHIC DISTRIBUTION

As to geographic location, 52 per cent of the 390 institutions scored were located in the Northern states, which include both the Northeastern and the Northcentral groups; 30 per cent were in the Southern states, which include both the Southeastern and the Southwestern groups; and 18 per cent were in the Western states, which include both the Mountain and the Pacific groups. This distribution, which is shown in Table 71, is very close to that of the 566 institutions teaching conservation (see p. 67).

Of the 203 schools located in the Northern states, 34 per cent scored in the Low group, 50 per cent in the Medium, and 16 per cent in the High group. The schools located in the Southern states scored slightly better, and those in the Western states decidedly better.

These regional differences cannot be fully understood without giving due consideration to the score variation by type of school.

TABLE 71

SCHOOLS CLASSIFIED BY GEOGRAPHIC LOCATION AND TYPE, AND BY PERCENTAGE DISTRIBUTION OF SCORES\*

Location and Type of School	Score						
	Total		Total		Low	Medium	High
	Number	Per Cent	Number	Per Cent	Per Cent	Per Cent	Per Cent
All Schools:							
Total	390	100	390	100	30	51	19
The North:							
Total	203	52	203	100	34	50	16
Four-Year	105	27	105	100	45	44	11
Teachers'	57	15	57	100	14	54	32
Junior	41	10	41	100	36	59	5
The South:							
Total	117	30	117	100	31	50	19
Four-Year	68	18	68	100	28	53	19
Teachers'	20	5	20	100	5	60	35
Junior	29	7	29	100	59	34	7
The West:							
Total	70	18	70	100	17	56	27
Four-Year	24	6	24	100	21	42	37
Teachers'	8	2	8	100	12	63	25
Junior	38	10	38	100	16	63	21

\* See explanation of scoring method, earlier in this chapter.

On a national basis the 85 Teachers' Colleges scored highest, the Four-year Colleges second, and the Junior Colleges lowest of the three groups. But the three types were not equally distributed over the United States; hence, this variation in score influenced the regional scores when all three types were averaged together. At the same time, the three types of schools varied regionally among themselves. Thus, the Four-year Colleges and Universities scored lowest in the Northern states and highest in the Western states. The Teachers' Colleges scored highest in the South, but there were relatively few of them located there. There are also very few Teachers' Colleges in the Western states. In the North, however, where the Teachers' Colleges comprised one fourth of all the schools scored, their high rating appreciably affected the total regional average. The Junior Colleges, generally, scored Low in the Northern and Southern states; but in the Western states, where they were relatively more numerous, they scored nearly as high as the Teachers' Colleges.

Thus, we find in the Northern states that the Four-year Colleges and Small Universities and the Junior Colleges scored about equally low, while the Teachers' Colleges scored much above them. In the Southern states the Junior Colleges scored very low and the Teachers' Colleges very high with the Four-year Colleges and Small Universities about average for the region. In the Western states, where the regional average ran well above the national average, all three types of schools scored well above the national average.

### SIZE OF PLACE OF LOCATION

With respect to size of place where located, 67 per cent of the 390 schools scored were located in places of less than 25,000 population; 17 per cent were located in places of 25,000 to 99,999; 9 per cent in places of 100,000 to 399,999; and 7 per cent in places of 400,000 or over (see Table 72).

TABLE 72  
SCHOOLS CLASSIFIED BY SIZE OF PLACE WHERE LOCATED, AND BY  
PERCENTAGE DISTRIBUTION OF SCORES\*

Population of Place Where Located	Total		Total		Score		
	Number	Per Cent	Number	Per Cent	Low	Medium	High
					Per Cent	Per Cent	Per Cent
Total	390	100	390	100	30	51	19
Under 25,000	260	67	260	100	29	51	20
25,000- 99,999	65	17	65	100	31	54	15
100,000-399,999	36	9	36	100	33	47	20
400,000 and over	29	7	29	100	38	48	14

\* See explanation of the scoring method, earlier in this chapter.

Of those schools located in places of less than 25,000 population, 29 per cent scored Low, 51 per cent Medium, and 20 per cent High. Of those located in places of 25,000 to 99,999, 31 per cent scored Low, 54 per cent Medium, and 15 per cent High. Of those located in places of 100,000 to 399,999, 33 per cent scored Low, 47 per cent Medium, and 20 per cent High. And of those located in places of 400,000 or over, 38 per cent scored Low, 48 per cent Medium, and 14 per cent High.

Thus, it is seen that in terms of score there was some relation between the programs in conservation education and the size of place where the institutions are located. As the size of place in-

creases, the proportion of institutions scoring Low tends to increase. The apparent tendency is for greater variability among institutions located in the larger places with some tendency to skewness toward the lower end of the score distribution.

The distribution of the three types of school by size of place varied but little except that the Teachers' Colleges were more concentrated in the smaller places. The scores of the Four-year Colleges and Small Universities followed the general pattern of the total group of 390 schools except for a noticeable concentration in the Low score group among those located in large metropolitan centers. The Teachers' Colleges had only 10 located in places of 50,000 or over. Of these, one scored Low, 6 Medium, and 3 High. Those located in places under 50,000 population scored considerably above average for all schools. The Junior Colleges, except for 9 cases, were located in places of less than 200,000 population. None of the 9 scored in the High group. Otherwise, there was scant relation of score to size of place where located.

#### SEX OF STUDENT BODY

Since the great majority of schools scored were coeducational in nature, the averages for all schools tended to be dominated by them. Hence, the distribution of scores for these schools was almost identical with that for all schools. The relatively small number of female colleges scored placed a higher proportion in the Low group (38 per cent) and a correspondingly smaller proportion (13 per cent) in the High score group. The still smaller number of men's colleges scored placed a considerably higher than average proportion (68 per cent) in the Medium group and correspondingly lower proportions in the Low and High groups.

#### SIZE OF STUDENT ENROLLMENT

With respect to enrollment, the entire group of 390 scored institutions tended to be dominated by small institutions: 38 per cent had fewer than 500 students enrolled, and 60 per cent fewer than 900 students. Twenty-two per cent had enrollments of 500 to 899; 15 per cent of 900 to 1,399; 13 per cent 1,400 to 2,499, and 12 per cent 2,500 or more. Only 7 per cent had 4,000 or more students enrolled (see Table 73).

Of the schools with an enrollment of less than 500 students, 44 per cent scored Low, 49 per cent Medium, and 7 per cent High. This was definitely below average for all schools scored. Schools enrolling 500-899 students placed 29 per cent in the Low score group,

TABLE 73  
SCHOOLS CLASSIFIED BY SIZE OF STUDENT ENROLLMENT, AND BY  
PERCENTAGE DISTRIBUTION OF SCORES\*

Size of Enrollment	Total		Total		Score		
					Low	Medium	High
	Number	Per Cent	Number	Per Cent	Per Cent	Per Cent	Per Cent
Total	390	100	390	100	30	51	19
Under 500	148	38	148	100	44	49	7
500- 899	86	22	86	100	29	54	17
900-1,399	60	15	60	100	23	52	25
1,400-2,499	49	13	49	100	10	51	39
2,500-3,999	21	5	21	100	29	57	14
4,000 and over	26	7	26	100	15	47	38

\* See explanation of the scoring method, earlier in this chapter.

54 per cent in the Medium, and 17 per cent in the High group. This was approximately average for all schools scored. However, when these schools were added to those with smaller enrollments, the distribution of scores for all schools with enrollments under 900 was still below average for the 390 schools scored. Institutions with enrollments of 900 or over scored considerably above average except for the relatively small group with enrollments of 2,500 to 3,999. Thus, it is clear that the size of the school measured in terms of student enrollment represents a factor that to a significant degree is positively related to the institutional score as used in this study. This supports the findings of Chapter 5.

This conclusion is clearly exemplified by each of the three types of institutions included here, namely, the Four-year Colleges and Small Universities, the Teachers' Colleges, and the Junior Colleges. The only modifying statement that needs to be made is that the contrast in scores resulting from variation in enrollment is most extreme in the case of the Four-year Colleges and Small Universities. In this group, the schools with less than 500 students scored approximately 50 per cent below the average for that group; and although the scores improved as the size of enrollment increased, it was not until the group with enrollments of 1,400-2,499 was reached that the scores exceeded the average for the group.

#### CHURCH RELATIONSHIP

Sixty-five per cent of the 390 institutions scored claimed no church connection. Twenty-three per cent maintained a Protestant

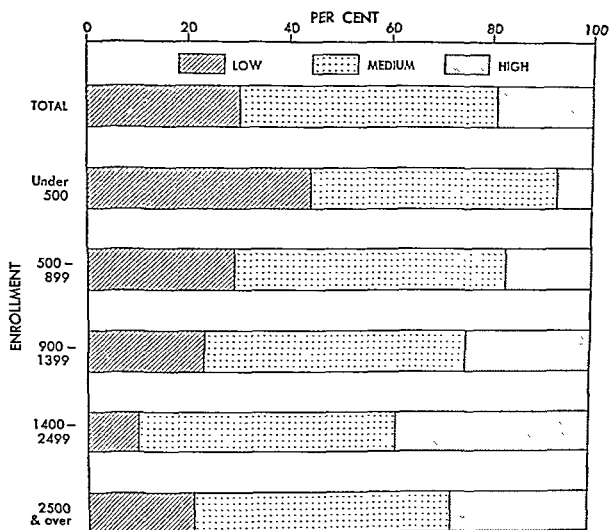


FIGURE 8. Percentage of schools in each score group, by size of school enrollment.

and 8 per cent a Catholic connection, making 31 per cent with some church connection. Four per cent had miscellaneous other connections or left the question unanswered.

When the scores of these institutions were viewed from the standpoint of their church relationship, the conclusion was clear that the extent of conservation teaching in these colleges and universities is related to whether or not the institutions are church-connected. Of the 252 institutions claiming no church connection, 21 per cent scored Low, 55 per cent Medium, and 24 per cent High. Of the 120 institutions claiming church connections, 50 per cent scored Low, 43 per cent Medium, and 7 per cent High.

Among the Teachers' Colleges only four were church-related. Three of these scored Medium and one High. The Junior Colleges offered a better comparison, with 18 institutions church-related as compared to 85 not. Of the former, 72 per cent scored Low and 28 per cent Medium. None scored High. Of the 85 colleges not church-



TABLE 73

SCHOOLS CLASSIFIED BY SIZE OF STUDENT ENROLLMENT, AND BY PERCENTAGE DISTRIBUTION OF SCORES\*

Size of Enrollment	Total		Total		Score		
					Low	Medium	High
	Number	Per Cent	Number	Per Cent	Per Cent	Per Cent	Per Cent
Total	390	100	390	100	30	51	19
Under 500	148	38	148	100	44	49	7
500-899	86	22	86	100	29	54	17
900-1,399	60	15	60	100	23	52	25
1,400-2,499	49	13	49	100	10	51	39
2,500-3,999	21	5	21	100	29	57	14
4,000 and over	26	7	26	100	15	47	38

\* See explanation of the scoring method, earlier in this chapter.

54 per cent in the Medium, and 17 per cent in the High group. This was approximately average for all schools scored. However, when these schools were added to those with smaller enrollments, the distribution of scores for all schools with enrollments under 900 was still below average for the 390 schools scored. Institutions with enrollments of 900 or over scored considerably above average except for the relatively small group with enrollments of 2,500 to 3,999. Thus, it is clear that the size of the school measured in terms of student enrollment represents a factor that to a significant degree is positively related to the institutional score as used in this study. This supports the findings of Chapter 5.

This conclusion is clearly exemplified by each of the three types of institutions included here, namely, the Four-year Colleges and Small Universities, the Teachers' Colleges, and the Junior Colleges. The only modifying statement that needs to be made is that the contrast in scores resulting from variation in enrollment is most extreme in the case of the Four-year Colleges and Small Universities. In this group, the schools with less than 500 students scored approximately 50 per cent below the average for that group; and although the scores improved as the size of enrollment increased, it was not until the group with enrollments of 1,400-2,499 was reached that the scores exceeded the average for the group.

### CHURCH RELATIONSHIP

Sixty-five per cent of the 390 institutions scored claimed no church connection. Twenty-three per cent maintained a Protestant

58 per cent in the Medium, and 32 per cent in the High. A total of 99 schools returned a conditional "Yes" to the question. These conditional answers ranged through such answers as, "Yes, for our type of institution," "Yes, for our curriculum," "Yes, for certain subject areas," and "Reasonably adequate." Of these schools, 22 per cent scored Low, 60 per cent Medium, and 18 per cent High. Of the 180 schools answering "No" to the above question, 44 per cent scored Low, 42 per cent Medium, and 14 per cent High. The remaining 25 schools were doubtful, uncertain, or confessed ignorance. Of these, 36 per cent scored Low, 56 per cent Medium, and 8 per cent High.

When the answers were analyzed by type of school, the Four-year Colleges followed substantially the same pattern as the total group with both respect to the answers to the above question and to the distribution of scores. Twenty-two per cent judged the teaching of conservation to be adequate, and the distribution of the scores of these institutions followed closely the distribution of the total group. Among the Teachers' Colleges, 24 per cent judged the teaching to be adequate, and none of them scored Low. Sixty-five per cent scored Medium and 35 per cent High. Among the Junior Colleges, only 20 per cent thought the conservation teaching adequate. Twenty-three per cent of these scored Low, 64 per cent Medium, and 13 per cent High.

The above data show that the judgment of the administrators who answered the questionnaire was related to the development of conservation teaching in the respective institutions as measured by the scoring device herein used. Those claiming that the conservation program was adequate scored lightly in the Low group and heavily in the High. Those answering in the negative scored heavily in the Low, and lightly in the High group. Those whose judgment was uncertain or qualified had intermediate scores.

The judgment of a group of persons teaching conservation regarding the conservation program at 270 of the 390 institutions scored is included in Table 74. These teachers replied to the specific question, "Is conservation receiving enough emphasis at your institution?", on the teacher questionnaire.

The replies received from teachers at the 270 institutions represented showed that the respondents at 17 per cent of the schools thought conservation was receiving enough emphasis; at 68 per cent of the schools, not enough emphasis; and at 8 per cent of the schools the respondents did not know. Those at 7 per cent of the schools did not answer the question.

related, 28 per cent scored Low, 58 per cent Medium, and 14 per cent High.

The church-related Four-year Colleges scored lowest. There were 98 such colleges; 48 per cent of them scored Low, 45 per cent Medium, and 7 per cent High. By contrast, the 86 schools claiming no church connection placed 22 per cent in the Low group, 52 per cent in the Medium, and 26 per cent in the High group.

Thus it appears that, for one reason or another, the colleges and universities maintaining church connections seem less disposed to offer much work in conservation education than those institutions claiming no such connections. This finding also supports the findings of Chapter 5.

### *Institutional Outlook*

#### ADEQUACY OF CURRENT PROGRAMS IN CONSERVATION EDUCATION

Administrators were requested to render an opinion regarding their institutional program of conservation education. Table 74 shows a tabulation of the replies for the 390 schools scored.

Of the 390 institutions scored, 22 per cent returned a positive "Yes" to the question, "Do you believe that the current teaching of conservation in your institution is adequate?" In terms of score, the institutions so represented placed 10 per cent in the Low Group,

TABLE 74

SCHOOLS CLASSIFIED BY EXPRESSED OPINION OF ADMINISTRATORS AND TEACHERS REGARDING THE ADEQUACY OF CONSERVATION TEACHING, AND BY PERCENTAGE DISTRIBUTION OF SCORES\*

Expressed Opinion	Total		Total		Score		
	Number	Per Cent	Number	Per Cent	Low Per Cent	Medium Per Cent	High Per Cent
Administrators:							
Total schools	390	100	390	100	30	51	19
Teaching adequate	86	22	86	100	10	58	32
Teaching adequate, with reservations	99	26	99	100	22	60	18
Teaching not adequate	180	46	180	100	44	42	14
Uncertain, unspecified	25	6	25	100	36	56	8
Teachers: Total schools	270	100	270	100	20	54	26
Enough emphasis	47	17	47	100	6	54	40
Not enough emphasis	183	68	183	68	21	56	23
Uncertain, unspecified	40	15	40	15	30	48	22

\* See explanation of the scoring method, earlier in this chapter.

clude conservation education, or in terms of a personal philosophy placing little stress on conservation education. Still, the work at the schools scoring Low was generally judged to be inadequate, and the work judged to be adequate was, in more than 90 per cent of the cases, in schools scoring Medium or High.

The 176 schools not scored because of incomplete schedules returned opinions regarding the adequacy of their programs in conservation education that were not markedly different from the 390 schools scored. The most significant difference was in the high proportion (18 per cent as compared to 2 per cent) that gave no reply. Eighteen per cent thought their programs were adequate. Only 33 per cent thought their programs were inadequate as compared to 46 per cent among the 390 institutions scored. On the whole, the respondents from these schools seemed to be less informed concerning their situation with respect to conservation education than respondents in the group of institutions scored.

#### PLANS FOR EXPANSION

All but 4 per cent of the 390 schools scored responded to the questions regarding the existence of plans for the expansion of conservation teaching. A total of 64 per cent had no such plans, but 32 per cent had plans (see Table 75).

Of the 123 schools reporting plans for expansion, 22 per cent scored Low, 50 per cent Medium, and 28 per cent High. Of the 251 schools with no plans for expansion, 33 per cent scored Low, 52 per cent Medium, and 15 per cent High.

As to type of school, it was found that two-thirds of the Four-year Colleges and Small Universities had no plans for expansion of conservation teaching, 28 per cent had such plans, and 6 per cent did not specify. Of the 55 institutions with plans, 24 per cent scored Low, 47 per cent Medium, and 29 per cent High. Of the 130 institutions with no plans, 39 per cent scored Low, 48 per cent Medium, and 13 per cent High.

Among the Teachers' Colleges, 60 per cent had no plans for expansion, 39 per cent had such plans, and 1 per cent did not specify. Of the 33 schools reporting plans, none scored Low, 55 per cent scored Medium, and 45 per cent High. Of the 51 schools reporting no plans for expansion, 18 per cent scored Low, 58 per cent Medium, and 24 per cent High.

As to the Junior Colleges, 65 per cent had no plans for expanding their work in conservation education, 32 per cent had such plans, and 3 per cent did not specify. Of the 35 schools reporting plans, 40 per cent scored Low, 49 per cent Medium, and 11 per cent High.

A comparison of the scores of these institutions with the judgments rendered by the teacher-respondents shows that the 47 schools at which conservation was said to be receiving enough emphasis placed 6 per cent in the Low group, 54 per cent in the Medium, and 40 per cent in the High. On the other hand, the 183 schools at which conservation was said to be receiving insufficient emphasis scored 21 per cent Low, 56 per cent Medium, and 23 per cent High. Those institutions at which the teacher-respondent returned a "Don't know," or no reply, scored still lower, i.e., 30 per cent Low, 48 per cent Medium, and 22 per cent High. These comparative results were duplicated for all three types of schools, namely, the general Four-year Colleges and Small Universities, the Teachers' Colleges, and the Junior Colleges. The results were particularly marked in the Teachers' College group, where interest in conservation ran highest. Here, all the fifteen institutions said to be giving enough emphasis to conservation scored Medium or High.

The first observation to be drawn from Table 74 is that an overwhelming majority of those who responded to the inquiry, both administrators and teachers, offered an opinion regarding the adequacy of conservation education in their respective institutions. Perhaps some respondents, without an opinion, consulted someone who had one, but at least they had sufficient interest to do so. The inference appears to be warranted that most of the teachers and administrators in the schools represented here are aware of the state of conservation education in their respective institutions and have an opinion concerning its adequacy for these times.

A second observation is that there was considerable correspondence between the results obtained by scoring these institutions and the judgments of the teachers and administrators. Both teacher and administrator opinion varied over a wide range, but there was a strong tendency to judge as adequate the conservation work offered in these schools that scored High, and a corresponding tendency to judge as inadequate the work in those schools that scored Low. This finding is of interest, because these respondents were in a position to evaluate the programs in terms of both their quantitative and their qualitative aspects, whereas the questionnaires provide little on the qualitative side.

It must be recognized, of course, that the opinions of these respondents reflect values either personal, institutional, or both, and therefore do not reflect the application of any objective criterion. The fact that some respondents reported as adequate the work of certain institutions that scored Low suggests that these programs were evaluated in terms of institutional objectives that do not in-

clude conservation education, or in terms of a personal philosophy placing little stress on conservation education. Still, the work at the schools scoring Low was generally judged to be inadequate, and the work judged to be adequate was, in more than 90 per cent of the cases, in schools scoring Medium or High.

The 176 schools not scored because of incomplete schedules returned opinions regarding the adequacy of their programs in conservation education that were not markedly different from the 390 schools scored. The most significant difference was in the high proportion (18 per cent as compared to 2 per cent) that gave no reply. Eighteen per cent thought their programs were adequate. Only 33 per cent thought their programs were inadequate as compared to 46 per cent among the 390 institutions scored. On the whole, the respondents from these schools seemed to be less informed concerning their situation with respect to conservation education than respondents in the group of institutions scored.

#### PLANS FOR EXPANSION

All but 4 per cent of the 390 schools scored responded to the questions regarding the existence of plans for the expansion of conservation teaching. A total of 64 per cent had no such plans, but 32 per cent had plans (see Table 75).

Of the 123 schools reporting plans for expansion, 22 per cent scored Low, 50 per cent Medium, and 28 per cent High. Of the 251 schools with no plans for expansion, 33 per cent scored Low, 52 per cent Medium, and 15 per cent High.

As to type of school, it was found that two-thirds of the Four-year Colleges and Small Universities had no plans for expansion of conservation teaching, 28 per cent had such plans, and 6 per cent did not specify. Of the 55 institutions with plans, 24 per cent scored Low, 47 per cent Medium, and 29 per cent High. Of the 130 institutions with no plans, 39 per cent scored Low, 48 per cent Medium, and 13 per cent High.

Among the Teachers' Colleges, 60 per cent had no plans for expansion, 39 per cent had such plans, and 1 per cent did not specify. Of the 33 schools reporting plans, none scored Low, 55 per cent scored Medium, and 45 per cent High. Of the 51 schools reporting no plans for expansion, 18 per cent scored Low, 58 per cent Medium, and 24 per cent High.

As to the Junior Colleges, 65 per cent had no plans for expanding their work in conservation education, 32 per cent had such plans, and 3 per cent did not specify. Of the 35 schools reporting plans, 40 per cent scored Low, 49 per cent Medium, and 11 per cent High.

A comparison of the scores of these institutions with the judgments rendered by the teacher-respondents shows that the 47 schools at which conservation was said to be receiving enough emphasis placed 6 per cent in the Low group, 54 per cent in the Medium, and 40 per cent in the High. On the other hand, the 183 schools at which conservation was said to be receiving insufficient emphasis scored 21 per cent Low, 56 per cent Medium, and 23 per cent High. Those institutions at which the teacher-respondent returned a "Don't know," or no reply, scored still lower, i.e., 30 per cent Low, 48 per cent Medium, and 22 per cent High. These comparative results were duplicated for all three types of schools, namely, the general Four-year Colleges and Small Universities, the Teachers' Colleges, and the Junior Colleges. The results were particularly marked in the Teachers' College group, where interest in conservation ran highest. Here, all the fifteen institutions said to be giving enough emphasis to conservation scored Medium or High.

The first observation to be drawn from Table 74 is that an overwhelming majority of those who responded to the inquiry, both administrators and teachers, offered an opinion regarding the adequacy of conservation education in their respective institutions. Perhaps some respondents, without an opinion, consulted someone who had one, but at least they had sufficient interest to do so. The inference appears to be warranted that most of the teachers and administrators in the schools represented here are aware of the state of conservation education in their respective institutions and have an opinion concerning its adequacy for these times.

A second observation is that there was considerable correspondence between the results obtained by scoring these institutions and the judgments of the teachers and administrators. Both teacher and administrator opinion varied over a wide range, but there was a strong tendency to judge as adequate the conservation work offered in these schools that scored High, and a corresponding tendency to judge as inadequate the work in those schools that scored Low. This finding is of interest, because these respondents were in a position to evaluate the programs in terms of both their quantitative and their qualitative aspects, whereas the questionnaires provide little on the qualitative side.

It must be recognized, of course, that the opinions of these respondents reflect values either personal, institutional, or both, and therefore do not reflect the application of any objective criterion. The fact that some respondents reported as adequate the work of certain institutions that scored Low suggests that these programs were evaluated in terms of institutional objectives that do not in-

clude conservation education, or in terms of a personal philosophy placing little stress on conservation education. Still, the work at the schools scoring Low was generally judged to be inadequate, and the work judged to be adequate was, in more than 90 per cent of the cases, in schools scoring Medium or High.

The 176 schools not scored because of incomplete schedules returned opinions regarding the adequacy of their programs in conservation education that were not markedly different from the 390 schools scored. The most significant difference was in the high proportion (18 per cent as compared to 2 per cent) that gave no reply. Eighteen per cent thought their programs were adequate. Only 33 per cent thought their programs were inadequate as compared to 46 per cent among the 390 institutions scored. On the whole, the respondents from these schools seemed to be less informed concerning their situation with respect to conservation education than respondents in the group of institutions scored.

#### PLANS FOR EXPANSION

All but 4 per cent of the 390 schools scored responded to the questions regarding the existence of plans for the expansion of conservation teaching. A total of 64 per cent had no such plans, but 32 per cent had plans (see Table 75).

Of the 123 schools reporting plans for expansion, 22 per cent scored Low, 50 per cent Medium, and 28 per cent High. Of the 251 schools with no plans for expansion, 33 per cent scored Low, 52 per cent Medium, and 15 per cent High.

As to type of school, it was found that two-thirds of the Four-year Colleges and Small Universities had no plans for expansion of conservation teaching, 28 per cent had such plans, and 6 per cent did not specify. Of the 55 institutions with plans, 24 per cent scored Low, 47 per cent Medium, and 29 per cent High. Of the 130 institutions with no plans, 39 per cent scored Low, 48 per cent Medium, and 13 per cent High.

Among the Teachers' Colleges, 60 per cent had no plans for expansion, 39 per cent had such plans, and 1 per cent did not specify. Of the 33 schools reporting plans, none scored Low, 55 per cent scored Medium, and 45 per cent High. Of the 51 schools reporting no plans for expansion, 18 per cent scored Low, 58 per cent Medium, and 24 per cent High.

As to the Junior Colleges, 65 per cent had no plans for expanding their work in conservation education, 32 per cent had such plans, and 3 per cent did not specify. Of the 35 schools reporting plans, 40 per cent scored Low, 49 per cent Medium, and 11 per cent High.



TABLE 75

SCHOOLS CLASSIFIED BY REPORTED PLANS FOR EXPANSION OF CONSERVATION EDUCATION PROGRAM, BY TYPE OF SCHOOL, AND BY PERCENTAGE DISTRIBUTION OF SCORES

Plans for Expansion	Total		Total		Score		
	Number	Per Cent	Number	Per Cent	Low	Medium	High
					Per Cent	Per Cent	Per Cent
All Schools: Total	390	100	390	100	30	51	19
Had plans	123	32	123	100	22	50	28
Had no plans	251	64	251	100	32	53	15
Not specified	16	4	16	100	63	31	6
Four-Year Colleges and universities: Total	197	100	197	100	36	47	17
Had plans	55	28	55	100	24	47	29
Had no plans	130	66	130	100	39	48	13
Not specified	12	6	12	100	59	33	8
Teachers' colleges: Total	85	100	85	100	12	56	32
Had plans	33	39	33	100	0	55	45
Had no plans	51	60	51	100	18	58	24
Not specified	1	1	1	100	100	0	0
Junior colleges: Total	108	100	108	100	35	54	11
Had plans	35	32	35	100	40	49	11
Had no plans	70	65	70	100	32	57	11
Not specified	3	3	3	100	67	33	0

Of the 70 schools reporting no plans, 31 per cent scored Low, 57 per cent Medium, and 11 per cent High.

Thus, we see that with respect to plans for the expansion of their work in conservation education, the various types of schools were remarkably consistent in that from 60 to 66 per cent had no such plans. Except among the Junior Colleges, where there was no significant difference, these institutions with no plans for expansion scored lower than the institutions of the same type that had such plans. In other words, the possession of plans for expansion of conservation teaching was positively related to the institutional score. Those institutions that scored highest were also the institutions that had plans for making their offerings in conservation education still better. This is a significant finding in that it suggests that among many of the schools offering little by way of conservation education there exists an attitude in administrative circles either indifferent to the subject or perhaps even opposed to developing it further. On the other hand, in those schools offering the most by way of conservation education there appears to exist a more favorable atti-

tude toward further expansion in the sense that plans for expanding are already in existence.

Of the 176 schools not scored because they returned incomplete schedules, the proportion reporting plans for expansion of their conservation education program was only half (16 per cent) that for the 390 schools scored. Seventy-three per cent reported no plans, and 11 per cent said they did not know, or failed to answer the question. This difference between the scored and unscored groups of institutions was fairly consistent for the three types of school.

### ASSISTANCE NEEDED

A total of 78 per cent of the 390 institutions scored expressed a need for some assistance in improving their programs in conservation education. Twenty-two per cent expressed no need for assistance. Table 76, which presents the data by type of school and by score, shows that 78 per cent of the Four-year Colleges and Small Universities, 88 per cent of the Teachers' Colleges, and 69 per cent of the Junior Colleges expressed a need for some assistance. Thus, the Teachers' Colleges, already offering a more elaborate program of conservation education than either of the other two types of school,

TABLE 76

SCHOOLS CLASSIFIED BY NEED FOR ASSISTANCE IN IMPROVING CONSERVATION PROGRAMS, BY TYPE OF SCHOOL, AND BY PERCENTAGE DISTRIBUTION OF SCORES

	Total		Total		Score		
	Number	Per Cent	Number	Per Cent	Low Per Cent	Medium Per Cent	High Per Cent
Assistance Needed							
All colleges: Total	390	100	390	100	30	51	19
Assistance needed	304	78	304	100	27	52	21
Assistance not needed	86	22	86	100	43	45	12
Four-year colleges and universities: Total	197	100	197	100	36	47	17
Assistance needed	154	78	154	100	32	51	17
Assistance not needed	43	22	43	100	49	32	19
Teachers' colleges: Total	85	100	85	100	12	56	32
Assistance needed	75	88	75	100	12	53	35
Assistance not needed	10	12	10	100	10	50	10
Junior colleges: Total	108	100	108	100	35	54	11
Assistance needed	75	69	75	100	31	54	15
Assistance not needed	33	31	33	100	45	52	3

expressed the greatest interest in obtaining assistance to expand their programs. The Junior Colleges were least interested in obtaining such assistance.

Table 76 also indicates that the schools expressing a need for assistance, in all three types of institution, scored higher than those schools not expressing such a need. The average for all types shows this distinction clearly. Of the 304 institutions expressing a need for assistance, 27 per cent scored Low, 52 per cent Medium, and 21 per cent High. The distinction was sharpest for the Teachers' Colleges and the Junior Colleges, where the schools expressing a need for assistance placed in the High score group more than three times the proportion of those asking for no assistance. The Junior Colleges requesting no assistance placed heavily in the Low score group.

The Four-year Colleges and Universities showed less difference between those expressing need for assistance and those not doing so. The former group scored close to average for all schools. However, those requesting no assistance, while scoring average in the High group, scored heavily in the Low group. It seems clear, therefore, that among all three types of school, those already offering most by way of conservation education tended to be the institutions most interested in expanding their offerings further.

It may be recalled that both administrators and teachers located in some schools in each of the three possible score groups—Low, Medium, and High—judged the teaching of conservation in their schools to be adequate (Table 74). However, these schools tended to be concentrated in the Medium and High groups. Of the schools in the same three score groups that did not regard their teaching of conservation as adequate, many had plans for expansion, but even more expressed a need for assistance. It seems reasonable to conclude that some schools with no particular urge to expand their program in conservation education would be willing to do so if the necessary resources were forthcoming.

As to types of assistance needed, 35 per cent specified teaching aids and help with curricula; 21 per cent specified personnel and administrative help; 12 per cent mentioned financial aid; and 9 per cent made miscellaneous requests. The suggested teaching aids included plant and equipment, such as laboratories and greenhouses, books and literature, visual aids, research, field work, and demonstrations. Personnel and administrative help included more and better teachers, visiting lecturers, closer government and college co-operation, better interdepartmental co-operation, and a changed administrative attitude. Financial assistance included research subsidies, scholarships, resources for part-time student em-

ployment, and government aid. Miscellaneous suggestions mentioned political pressures on state legislatures to get more conservation teaching required, greater urban interest in conservation, need to stimulate public awareness of conservation problems, etc.

Many of the statements of assistance needed were rather vaguely expressed, and it seems unlikely that the needs were clearly formulated in the minds of those responding to the inquiry. Some of the statements suggest that something more than money is needed. But in any case, it seems fairly certain that many institutions could use some help in developing their limited programs in conservation education, and some apparently would welcome the opportunity.

We have seen that nearly half (46 per cent) of those responding to the administrative questionnaire, including administrators at all 390 schools scored, judged the program in conservation education at their respective institutions to be inadequate for these times.<sup>4</sup> We have seen, too, in a separate inquiry, that teachers of conservation located at 270 of the 390 schools judged 68 per cent of them to have inadequate programs in conservation education. Also, we have seen that the schools said to have inadequate programs did not cluster together according to our scoring device, but that some scored Low, some Medium, and some High. However, both administrator and teacher responses from those institutions said to have adequate programs scored far above the average, and those said to have inadequate programs scored far below the average for all institutions. Hence if, on the one hand, we take the judgments of the administrators and teachers as the criterion, we can conclude that the results of the scoring device are correlated with the judgments of those persons located in the institutions and familiar with the programs scored. But if, on the other hand, we take the results of the scoring device as the criterion, we can conclude (1) that in many institutions the local administrators and teachers of conservation recognize the inadequacies of their programs; and (2) that even among those institutions offering the best programs in conservation education, there are those who feel their offerings to be inadequate based upon their conception of current need. It is of interest to note that of the 185 institutions judged by administrators to have adequate programs (i.e., adequate either with or without qualification) only 16 per cent scored Low.

<sup>4</sup> A small minority of these were heads of departments involved in conservation teaching, and they may have been more severe in their judgments than an administrator would have been. However, in those cases the inquiry had been referred to them by the president's office, and hence their reply could be taken as the official opinion of the institution.

Fewer institutions reported plans for improvement of their programs in conservation education than judged those same programs to be inadequate. Although 46 per cent reported inadequate programs, only 32 per cent reported plans for expansion. This suggests that future developments with respect to conservation education in these institutions may result in a greater differentiation of programs than now exists. That is to say, there may be a tendency for the institutions with average or better programs to make them better, whereas those schools with less than average programs may tend to retain them as they are.

Expressions of needed assistance were distributed about equally throughout the score groups. Among the Teachers' Colleges, however, where more than average interest in conservation exists, expressions of needed assistance came heavily from High score schools. These schools, which generally draw their support from public sources, and are often operated under state legislation that requires conservation education as a part of teacher preparation, appear to be well aware of their responsibility and a goodly proportion seem eager to improve their programs.

So far as Four-year and Junior Colleges are concerned, the reports on the occurrence of plans for expansion suggest that the likelihood of improvement of present programs and the existence of plans for improvement are distributed somewhat at random among the institutions, and also that the feeling of need for assistance in making any improvement in the present situation is distributed among these institutions in somewhat the same manner.

### *Chief Characteristics of the Score Groups*

#### THE HIGH SCORE GROUP

The 73 institutions comprising this group may be characterized briefly as follows: They are most likely to be found in the Northern states (46 per cent), although nearly one third (30 per cent) are in the Southern states. This leaves one fourth (26 per cent) in the West. The 34 Four-year Colleges and Small Universities included in this group have the average proportion in the West but there are fewer of them in the Northern states (35 per cent) and more in the Southern states (39 per cent). The 22 Teachers' Colleges are heavily concentrated (60 per cent) in the Northern states. Only 7 per cent are in the West. On the other hand, the Junior Colleges are concentrated in the West (67 per cent). However, only a dozen of these colleges scored in this High group.

More than two thirds (71 per cent) of the High score schools are located in places of less than 25,000 population. Only 6 per cent are located in places of 400,000 or more population, and only 16 per cent in places of 100,000 or more. The Four-year Colleges and Small Universities follow the average pattern except that a higher proportion is found in the larger places. Seventy-seven per cent are in places of less than 50,000 population, and 12 per cent in places of 400,000 or over. None of the Teachers' Colleges is to be found in places of 400,000 or more population, and 89 per cent are in places of less than 25,000 population. The high-scoring Junior Colleges are all located in places of less than 200,000 population, and nearly three fifths (58 per cent) are in places of less than 25,000 population.

These High score schools are predominantly (86 per cent) co-educational, either wholly or in part, with the Four-year Colleges and Small Universities running a bit below the average and the Teachers' Colleges a little above it. A total of 45 per cent operate a specialized curriculum, including Education. One third have a diversified curriculum, and one in five emphasize Liberal Arts or Arts and Science.

More than four fifths (82 per cent) of these schools have no religious affiliation; those which do are evenly divided between Catholic and Protestant connections. One third of the Four-year Colleges and Small Universities and only 4 in 100 of the Junior Colleges are church-related. Nearly three fourths (73 per cent) of all these High score schools are supported by public funds.

These High score schools vary greatly in enrollment, although not many of them are really small in size. Forty-two per cent of them had enrollments between 500 and 1,400 in 1954, and nearly one in five (18 per cent) had 2,500 or more students enrolled. Only 15 per cent had fewer than 500 students. Among the Four-year Colleges and Small Universities, both small and large enrollments were more common. One in five had fewer than 500 students, but nearly one in three (30 per cent) had 2,500 or more. No Teachers' College in this group had as many as 2,500 students, but two thirds of them had 900-2,499 students. Only one in ten had as few as 500 students. The Junior Colleges also tended to be relatively large. Nearly three in five (58 per cent) had 1,400 or more students, and 34 per cent had 500-2,499 students enrolled.

Only five schools offered a special degree in conservation at the time of this survey, but one in five offered an undergraduate major. The three types of school were similar in this respect.

As to method of offering the work in conservation, the modal group among these high-scoring institutions (a total of 73 per cent) offered both special courses and integrated courses. An additional one fourth (26 per cent) offered only integrated courses. Only one school offered the work solely through special courses. The Four-year Colleges and Small Universities were close to the average, but 58 per cent of the Junior Colleges offered the work through integrated courses alone. No Teachers' College relied on special courses alone, but more than four out of five used both special and integrated courses.

In these high-scoring schools, the number of teachers offering work in conservation is not less than two, and it is likely to be five or more, since two thirds of the schools had that many. None of the Four-year Colleges and Small Universities had less than three conservation teachers, and half of them had six or more. No Junior Colleges had less than four. The Teachers' Colleges exemplified the average. These variations among the three types of school may be attributed largely to variation in the proportion of special and integrated courses offered. The latter type of offering tends to involve more courses, and hence, more teachers.

The number of aspects of conservation taught is likely to be seven or more. As many as three fifths of these schools taught minerals, soils, water, wildlife, forests, ecology, and recreation. Nearly half of them also offered work in range management and a number offered oceanography.

The departmental, or subject-matter areas involved in the conservation education program are likely to be Natural Science, Physical Science, Geography, Social Science, Agricultural Science, and Education with occasionally Physical Education and Business, in the order given. This is the order of involvement for all schools scored, regardless of score group. However, in terms of school type, Teachers' Colleges are likely to involve Education before Agricultural Science; Junior Colleges are likely to involve Agricultural Science before Geography, and Physical Education before Education. The number of subject areas involved is likely to vary somewhat with the number of teachers of conservation.

More than nine out of ten of these high-scoring schools make use of visual aids and field trips as teaching devices, and more than three fourths employ special laboratory work and visiting lecturers. All three types of school are near the average in these respects. Nearly nine out of ten regard their library as adequately equipped for their conservation teaching, and only 1 in 100 feels that it is definitely not adequately equipped. There was great similarity

among the three types of school in their answers to this question, but the Junior Colleges were a little less certain that their libraries were entirely adequate. These institutions generally (62 per cent) offer some extension work, short courses, or workshops for public participation in conservation education.

In nearly two fifths of the cases, administrators believe their current programs of conservation education to be adequate. (It has been shown elsewhere in this study that the teachers are likely to be less optimistic, see Chapter 6). One fourth thought their programs were adequate only in part and gave qualified answers. Half of the Four-year Colleges and Small Universities believed their conservation programs to be entirely adequate, and 15 per cent gave qualified answers. Only one fourth thought their programs were definitely not adequate. The Teachers' Colleges were less well satisfied. Only one in four thought their programs were adequate and one in three thought them inadequate. Junior College evaluations were similar to those of the Teachers' Colleges.

As to improvement, nearly half (48 per cent) of these high-scoring institutions claim plans for improving their programs in conservation education. The Four-year Colleges and Small Universities are average in this respect, and the Teachers' Colleges only a shade below them. However, among the Junior Colleges only one in three claims to have any plans for improving its program.

This group is favorable to some sort of assistance in improving their programs in conservation education. Only 14 per cent returned a negative answer. The proportion replying in the negative was highest (24 per cent) among the Four-year Colleges and Small Universities, and lowest (4 per cent) among the Teachers' Colleges. Among the Junior Colleges 8 per cent reported no need.

### THE LOW SCORE GROUP

This group of 119 institutions is composed of 71 Four-year Colleges and Small Universities, 10 Teachers' Colleges, and 38 Junior Colleges. As to location, 58 per cent are in the Northern states, with two in five located in the Northcentral states alone. Nearly one third (31 per cent) are in the South, and 10 per cent are in the Western states. Two thirds of the Four-year Colleges and Small Universities are to be found in the Northern states, only 27 per cent are in the Southern states, and 7 per cent in the Western states. The Teachers' Colleges are even more concentrated (80 per cent) in the Northern states, with only 10 per cent each in the South and West. The Junior Colleges, on the other hand, tend to concentrate



in the Southern states with 45 per cent located there. Forty per cent are in the North and 16 per cent in the West.

Nearly two thirds (64 per cent) are found in places of less than 25,000 population, and 81 per cent in places of less than 100,000. Less than one in ten is located in a place of 400,000 population or over. A slightly higher proportion of the Four-year Colleges and Small Universities are to be found in the larger centers, but the Teachers' Colleges are more heavily concentrated in the smaller centers. Nine out of ten are located in places of less than 50,000 population. The Junior Colleges are found mostly in the small and medium-sized places; only 3 per cent in places of 400,000 population or more, and 68 per cent in places of less than 25,000 population.

The modal group is made up of small institutions; 55 per cent had fewer than 500 students enrolled during the academic year 1953-54 and 76 per cent had fewer than 900 students. One in 12 had as many as 2,500 students, and 1 in 30 had as many as 4,000 students. The Four-year Colleges and Small Universities had a still higher proportion (67 per cent) with fewer than 900 students, but 12 per cent had 2,500 or more students. The Teachers' Colleges all had fewer than 1,400 students, and 70 per cent had fewer than 500. The Junior Colleges were intermediate, with none having as many as 4,000 students, and three in four having fewer than 500 students.

The predominant type of curriculum is Arts and Sciences or Liberal Arts, offered by 57 per cent. One school in four has a diversified curriculum. The others are specialized, a few of them being schools of Education. The Four-year Colleges and Small Universities are more likely than average (64 per cent) to offer Arts and Sciences or Liberal Arts, but nearly one in twenty has a diversified curriculum. The Teachers' Colleges are, of course, specialized in Education, while the Junior Colleges are either of the Arts and Sciences type or diversified.

These schools are 85 per cent coeducational. Fewer than 1 in 7 are female colleges, and only 1 in 30 is a college for males only. Nearly 7 out of 10 (68 per cent) are privately supported institutions, and almost one third (31 per cent) are supported by public funds. Half of these schools are church-related; 39 per cent are Protestant and 12 per cent Catholic.

In 1954 none of these schools offered an undergraduate minor in Conservation and only 1 in 60 offered an undergraduate major. None offered a special degree in Conservation. This group of schools offered their work in conservation education chiefly by means of a few integrated courses. Three fifths of them did it that way. An additional one fourth offered special courses, making 86 per cent

that offered the work either through a few integrated courses or through one or more special courses. Only 7 per cent offered both special and integrated courses. The Four-year Colleges and Small Universities group followed the average pattern. All the Teachers' Colleges offered their work in conservation through either a few integrated courses or a special course, but only 84 per cent of the Junior Colleges did so. Sixteen per cent of them offered many integrated courses, or a combination of special and integrated courses.

These schools generally had from one to three teachers offering work in conservation education. Approximately one third had one teacher, one third had two teachers, and a total of 91 per cent had no more than three teachers of conservation. These teachers were most likely to offer work in soils, water, forests, and minerals. This was true of all three types of institutions. The subject-matter areas involved in this teaching were most likely to be Natural Science and Physical Science. The Four-year Colleges and Small Universities conformed to the average. Half of the Teachers' Colleges had one teacher and two fifths had three. Two fifths of the Junior Colleges had two teachers and 92 per cent had no more than three.

Among this group of schools, four out of five used visual aids in teaching conservation, and three out of four used field trips as a teaching device. However, only two in five used special laboratory work and one in four used visiting lecturers. These proportions tended to be a little lower for the Four-year Colleges and Small Universities, and a little higher for the Teachers' Colleges. The Four-year Colleges and Small Universities and the Junior Colleges followed the average closely, but the Teachers' Colleges rated slightly higher in the use of teaching aids and special laboratory work.

Three out of five of these schools judged their libraries to be inadequate for conservation teaching, and only 18 per cent believed them to be wholly adequate. Another 18 per cent thought them adequate in some fields. The Junior Colleges were a bit more optimistic about the condition of their libraries, and the Teachers' Colleges decidedly more pessimistic about theirs. Of the latter, four out of five judged their libraries to be inadequate for conservation education.

Ninety-two per cent of these schools offered no extension work, short courses, or workshops in conservation education. This figure held substantially for all three types of school.

As to the adequacy of their college program in conservation education, two thirds believed it to be inadequate, and only 8 per cent believed it to be entirely adequate. However, nearly one in five

(18 per cent) thought it to be adequate in certain respects, or in certain subject areas. Eight per cent were doubtful, uncertain, or did not answer the question.

Approximately two thirds (69 per cent) of this group had no plans for expanding their programs in conservation. Fewer than one third (23 per cent) did have such plans. Among the Four-year Colleges and Small Universities, only 18 per cent had any plans for expansion, and none of the Teachers' Colleges reported any such plans. The Junior Colleges were more interested in expanding their programs; 37 per cent reported plans for the purpose.

More than two thirds of this group claimed they needed assistance for expansion of their conservation teaching. One third needed teaching aids and curricular help, 18 per cent needed help with personnel and administration, and 13 per cent specified financial aid.

### THE MEDIUM SCORE GROUP

As might be expected, the Medium group represents the average of all schools scored. This does not mean, of course, that for all points considered, either as factors in the score or as background, this group represents a strict numerical average. However, in all these respects the group lies close to the average for all 390 schools, and in many respects practically duplicates it.

This group is composed of 198 colleges and small universities of which half are located in the Northern states, a little less than one third in the Southern states, and one fifth in the Western states. One third are concentrated in the Northcentral states alone. The Four-year Colleges and Small Universities have a larger proportion (39 per cent) located in the South, and a correspondingly lighter representation (11 per cent) in the West; half are in the North. The Teachers' Colleges are heavily concentrated (65 per cent) in the Northern states, and have relatively lighter representation in both the South and West. The Junior Colleges are concentrated (41 per cent) in the West with correspondingly lighter representation in both the North (42 per cent) and the South (17 per cent).

As to size of place where located, this group represents the mean for all schools scored with 78 per cent located in places of less than 50,000 population, and 15 per cent in places of 100,000 or over. Two thirds are located in places of less than 25,000 population. One third of these schools offer an Arts and Sciences curriculum, 32 per cent a diversified curriculum, and nearly one fourth offer Education as a major curriculum. Eighty-five per cent of these schools are coeducational, but 13 per cent are women's colleges.

The size of enrollment shows this group to be at or near the mean for all schools scored, for all enrollment groups. More than one third of the schools have fewer than 500 students, and 59 per cent have fewer than 900 students. Only 12 per cent have 2,500 or more students. Among the Teachers' Colleges, however, only 4 per cent have as many as 2,500 students. Two thirds have fewer than 900 students.

A slightly higher than average proportion (56 per cent) are publicly supported and 5 per cent less than average are supported by private funds. Seven out of ten, which is 5 per cent above the average, possess no church connection.

With respect to how conservation courses are offered, this group lies between the Low and High score groups. Forty-five per cent offer only integrated courses, and 17 per cent only special courses. Thirty-seven per cent offer both. Only 5 in 100 offer an undergraduate major in conservation. One, a Teachers' College, offers a special degree in Conservation Education.

The number of persons teaching conservation is as likely as not to be two or three. 78 per cent of the schools have one to four. Twenty-two per cent have five or more teachers of conservation, and 7 per cent have seven or more. Nearly three fourths of the Teachers' Colleges have two, three, or four teachers of conservation.

Among the aspects of conservation taught, this Medium group is most likely to offer soils, minerals, water, forests, and wildlife. It is least likely to offer work in recreation, range management, and oceanography. A total of 93 per cent use visual aids and field work in teaching conservation, and more than half employ special laboratory work and visiting lecturers. Three fifths believe their library is entirely adequate for the conservation teaching done, and only 15 per cent feel that it is definitely not adequate. The Four-year Colleges and Small Universities are less positive (51 per cent) about the adequacy of their libraries, and the Teachers' Colleges and Junior Colleges are more positive (69 per cent). Only 8 per cent of the Teachers' Colleges feel that their libraries are definitely not adequate, as compared to 18 per cent for the Four-year Colleges and Small Universities.

As to the reported adequacy of their conservation programs, this Medium group ranks slightly above the average for all schools scored. A total of 55 per cent believe their programs to be adequate, with less than half of them offering no reservations or qualifications. Thirty-eight per cent believe their programs to be inadequate. This figure, however, is influenced considerably by the Junior Colleges, of which 43 per cent believe their programs to be inadequate.

Among the Four-year Colleges and Small Universities and Teachers' Colleges, only one third believed their programs in conservation to be inadequate.

With respect to plans for the expansion of their programs in conservation education, this Medium score group is about average for all 390 institutions scored. Thirty-one per cent claimed to have some plans, as compared to 32 per cent for all 390 schools. The proportion with plans varied from 28 per cent among the Four-year Colleges and Small Universities, and 29 per cent among the Junior Colleges, to 38 per cent among the Teachers' Colleges.

Four out of five schools in this Medium score group expressed an interest in receiving some assistance in improving their programs in conservation education. This proportion is near the average for all schools scored. The Junior Colleges showed the least concern; only 71 per cent were interested. However, the Teachers' Colleges and the Four-year Colleges and Small Universities were strongly interested. Of these, 84 per cent expressed an interest in receiving assistance, the types most desired being teaching aids and assistance with curricular problems.

## *PART III*

### *Summary and Implications*

Among the Four-year Colleges and Small Universities and Teachers' Colleges, only one third believed their programs in conservation to be inadequate.

With respect to plans for the expansion of their programs in conservation education, this Medium score group is about average for all 390 institutions scored. Thirty-one per cent claimed to have some plans, as compared to 32 per cent for all 390 schools. The proportion with plans varied from 28 per cent among the Four-year Colleges and Small Universities, and 29 per cent among the Junior Colleges, to 38 per cent among the Teachers' Colleges.

Four out of five schools in this Medium score group expressed an interest in receiving some assistance in improving their programs in conservation education. This proportion is near the average for all schools scored. The Junior Colleges showed the least concern; only 71 per cent were interested. However, the Teachers' Colleges and the Four-year Colleges and Small Universities were strongly interested. Of these, 84 per cent expressed an interest in receiving assistance, the types most desired being teaching aids and assistance with curricular problems.

# 10

## SUMMARY OF FINDINGS

This study was undertaken to determine the current status of the teaching of conservation in the colleges and universities of the United States. Part I of the two-part study is historical and theoretical. Chapter 1 discusses such questions as "What is a resource?," "What is conservation?," and "What is resource education?" A resource is taken to be anything that can be used to contribute toward achieving a given objective or end. The resources available to a people, and at any given time utilized by them, are regarded as a joint function of the environment and of the sociocultural level of the people. From this point on, the discussion is limited to the conservation of natural resources, and some of the more widely used concepts of this type of conservation are critically reviewed. Finally, the conservation of natural resources as a societal objective is defined in terms of seven tasks and a degree of understanding to which any society must aspire if it would undertake a complete program of conservation. These tasks, presented more fully at the end of Chapter 1, page 14, are: to maintain knowledge of the supply of natural resources; to husband those in scant supply and to recover them if possible; to replace those which are renewable; to anticipate needs from population changes; to develop scientific technology at a rate sufficient to maintain consumable supplies at an optimum; to educate toward the necessity of adjusting demand to supply; and to educate toward the necessity of maintaining the ecological balance in nature.

Any society concerned with something less than this list of tasks must be regarded as practicing only partial conservation. In terms of these tasks, and for a dynamic society, conservation is defined briefly as the process of balancing the use of natural resources and the varying demands of population in such a manner that existing



tion movement was well on its way. Soils research in the Agricultural Experimental Stations of the land-grant colleges provided scientific information for resident teaching, and the Agricultural Extension Service carried the same information to the farmers on the land and instructed them in the techniques of soil conservation practice.

The conservation of wildlife as a legitimate aspect of conservation education was also a latecomer. It was long assumed that the natively abundant wildlife would eventually disappear as civilization advanced, and that all that could be done was to postpone that day as long as possible. But with the rise of the conservation movement, when the notion of renewable resources was introduced, the perpetuation of wildlife became a cause for promotion. Among the best promoters of the cause were the trained foresters who grasped early something of the ecological relationships involved in wildlife preservation. An increasing number of voluntary organizations began to support the movement, but comparatively little research was undertaken until after 1930. The work of Aldo Leopold, a trained forester who produced some highly significant wildlife research literature, resulted in his appointment as a professor of game management at the University of Wisconsin in 1933. The publication of his book, *Game Management*, the same year, provided the basis for education in the conservation of wildlife at the college level.

Since its inception, conservation education at the college level has been chiefly concerned with the training of specialists who expect to find an occupational career in some aspect of this field. Conservation as a part of general education at the college level has developed more slowly. Although many institutions have offered courses in general conservation for years, relatively few college students have ever been exposed to such teaching. Even in the schools where such courses are offered, apparently no very significant percentage of the student body is ever enrolled in these courses, except in teachers' colleges.

Only a few limited studies of the situation have been made. Quaintance, in his 1938 study of 651 institutions, found that the land-grant colleges and universities and the teachers' colleges led the list in terms of both proportion of institutions offering courses in conservation, and of the number and variety of courses offered. Funderburk found that few of the 107 institutions studied had offered a course in general conservation before 1920, although all were doing so at the time of investigation in 1947. Half of them had offered their first course during the five-year period, 1935-39, and only eight during the subsequent eight years. Clagg, in a field study

resource supplies will not become exhausted before adequate substitute supplies have been discovered or invented and made available for use.

In Chapter 2 the story of the early exploitation of the natural resources of the United States and the subsequent rise of the conservation movement is briefly told. Some of the forerunners of the conservation movement are mentioned, and the beginning of the movement itself is reckoned at about 1900. To date, the conservation movement has been concerned chiefly with timber, soil, and wildlife, though water is now becoming a matter of national concern and may be expected to receive more consideration in the future.

Chapter 3 deals with the rise of conservation education in the institutions of higher learning in the United States. Conservation education is conceived to be education for a way of life involving a personal and social philosophy and a set of attitudes and habits toward nature, life, and human society. Conservation education does not consist merely of imparting a special body of information, nor of training personnel for specific jobs but it embodies cultural as well as vocational aspects. To be effective, it must reach all the people.

In the United States, conservation education appears to have had its beginnings in a few colleges and universities stimulated by a handful of scientists (chiefly natural scientists) who were concerned about the exploitation and destruction of the virgin forests. From these simple beginnings, schools of forestry were established and, in the course of time, became one of the major lines of conservation emphasis in the land-grant colleges and universities. This movement was getting under way by 1900, and developed rapidly thereafter. By June, 1947, a total of 15,662 degrees had been granted by the 42 schools of forestry that had been in existence during all or a part of the previous 47 years.

Education in soil conservation came more slowly. The process of soil erosion had been less spectacular than the destruction of the forests, and the notion of soil exhaustion had not yet penetrated to the farm population. Soil science was in its elementary stages in 1900, and Europe did not supply trained leadership as in the case of forestry. Research in soils was centered primarily upon the conditions necessary for plant growth. As investigations gradually got under way, some pertinent literature in the field began to appear, but it did not arrive in volume until after 1930. In supplying pertinent information and in stimulating public interest, the work of Dr. H. H. Bennett was outstanding. With the creation of the CCC camps in 1933, and the Soil Conservation Service in 1935, the soil conserva-

centages were 46 for the schools in the Southeastern states, 61 per cent for the schools in the Southcentral states, and 68 per cent for those located in the Pacific states. The junior colleges tended to follow the general average pattern: the teachers' colleges and the four-year colleges and small universities showed their highest proportions teaching conservation to be in the Central states. The specialized schools showed an erratic tendency, perhaps because of the small numbers in some areas. The figures suggest that the farther west a school is located the more likely it is to teach conservation; and, when the land-grant and other large universities are added to the group, this tendency becomes even more evident.

The size of place in which schools are located appears to be inversely related to the proportion teaching conservation. Of 95 schools located in places with a population of 750,000, only 32 per cent were teaching some conservation; whereas, of those schools located in places with a population of less than 50,000, 62 per cent were teaching some conservation. Schools located in places with populations of 50-199,000 were teaching conservation in 49 per cent of the cases, whereas of schools located in places with populations of 199-749,000 only 42 per cent taught conservation. This relationship held very well for the four-year colleges and small universities, and with some variation for the other types of school. Since virtually all the land-grant institutions were teaching conservation, and since they were mostly located in relatively small centers of population, their addition to the group of smaller institutions served to accentuate the tendency.

The colleges with a specialized, technical curriculum, except for teachers' colleges, were least likely to be teaching conservation. However, teachers' colleges were more likely to be teaching conservation than any other type of school, except the land-grant and large universities. Only half of the arts and sciences type of college were found to be teaching conservation.

Schools with some religious affiliation were less likely to be teaching conservation than schools with no such affiliation. Schools affiliated with the Catholic church were teaching conservation in only one third of the cases. For schools affiliated with Protestant churches, the corresponding percentage was 52, and for schools with no religious affiliation it was 68 per cent. In like manner, schools supported by public funds showed 78 per cent teaching some conservation, whereas only 52 per cent of the privately supported schools taught some conservation. These figures apply to the 1,024 institutions only. If to those are added the 51 land-grant

limited to courses in general conservation in 36 Southeastern colleges and universities, found that approximately three fourths of such courses were being taught by geographers. Conservation with respect to soil, water, forests, minerals, and wildlife were generally taught by all these schools, and classes averaged about 27 students. Nowhere was such a course required of all students. Students taking the courses were chiefly prospective teachers plus a few majors in conservation or related subjects. Thus, even courses not organized for the training of specialists did not appear to be reaching any high proportion of the students enrolled in the institutions studied.

Part II reports the results of an investigation of the teaching of conservation in the colleges and universities of the United States. A questionnaire sent to the administrative heads of 1,496 colleges and universities was returned by 1,024 of them. These institutions included four-year colleges and universities, teachers' colleges, junior colleges, and special schools. All had enrollments of less than 7,000 students. Institutions with enrollments of 7,000 or more students, including all land-grant colleges and universities, were investigated by a study of their catalogues. Thus, a total of 1,116 schools were investigated. A separate questionnaire sent to the persons teaching conservation in these institutions was returned by 626 teachers. Chapters 4 to 9 contain an analysis of the data thus obtained. Chapter 5 is concerned with the content of the administrative questionnaire.

### *Schools Teaching Conservation*

Of the 1,024 schools answering the administrative questionnaire, 55.3 per cent were teaching some conservation. This figure varied from 89.2 per cent among the 130 teachers' colleges to 30 per cent among the 99 special schools. The four-year college and small universities group and the junior college group were virtually tied at 53 per cent. Thus, the teachers' colleges were far above the average, and the special schools far below it, in the frequency of their interest in teaching conservation to college students. Of the land-grant and large universities, 94 per cent were teaching some conservation.

This pattern of teaching or not teaching conservation varied considerably by geographic areas. In the Northeastern states only 44 per cent of the 244 schools taught some conservation, as contrasted with 73 per cent in the Mountain states. In the Northcentral states, where the largest regional group of schools is located, 64 per cent were teaching some conservation. The corresponding per-

## ASPECTS OF CONSERVATION TAUGHT

In the 566 schools reporting some conservation teaching on the administrative questionnaire, the aspects of conservation taught, arranged in descending order of probability, were soils, forests, water, wildlife, ecology, minerals, recreation, range management, and oceanography. The order of major emphasis was similar. The work in conservation was offered most frequently in the area of natural science, followed by physical science, geography, social science, agricultural science, education, and business, in that order. This order was reasonably consistent for all types of school except the special schools. The size of school appears to exert little effect upon this order of priority. Only 6 per cent of these schools offered a major in the subject, and only 1 per cent gave a special degree. In presenting the subject to students, there was considerable variation. Nearly 40 per cent of the schools integrated the subject matter into a few related courses. This was especially true of the junior colleges and special schools. Teachers' colleges favored special courses but gave integrated courses as well. Only one in ten offered both special courses and many integrated courses. The data suggest that few schools now regard conservation as an essential subject for all college students.

## NUMBER AND TRAINING OF TEACHERS

More than two fifths (44 per cent) of the 566 schools reported either one or two staff members teaching some conservation. Another 29 per cent reported three or four such teachers, making a total of 73 per cent that had from one to four teachers. However, the modal group of schools (24 per cent) had only two persons who taught some conservation. Only 14 per cent of the 566 schools reported six or more such teachers. The variation in number of teachers in the different types of school was closely related to that of the total for all schools.

Sixteen per cent of the institutions teaching some conservation reported no teachers with special training for the task. Teaching aids in the form of visual aids and field trips were in use by four out of five schools, but less than half of them employed special laboratory work and visiting lecturers in the teaching of conservation. The teachers' colleges ranked much above the average in the use of these teaching devices.

Three out of ten of the institutions offered some extension work, special conservation conferences, or short courses. The teachers'

institutions publicly supported, the proportion of nondenominational schools teaching conservation rises to 75 per cent.

Only 26 per cent of the colleges operated solely for male students taught some conservation. However, the female colleges taught conservation in 41 per cent of the cases, while 62 per cent of the 751 coeducational schools, not including the land-grant and large universities, taught some conservation. With the coeducational land-grant institutions added, the proportion rises to 64 per cent.

The size of the school, as measured by student enrollment, appears to be directly related to the probability that the school will be teaching conservation. Schools enrolling fewer than 500 students were teaching some conservation in only 46 per cent of the cases. But schools enrolling from 500-899 students reported 57 per cent teaching conservation, and among schools with 900 or more students, 69 per cent were teaching conservation. All but one of the 51 land-grant colleges and universities were teaching conservation, and so were all but 5 of the 41 other large schools, to some extent. All types of school followed this pattern, except that the land-grant institutions were likely to teach some conservation regardless of the size of the student enrollment.

Hence, by way of recapitulation, it may be said that since all colleges and universities tend to be concentrated in the North-central, the Northeastern, and the Southeastern groups of states, the largest numbers of schools teaching as well as not teaching conservation are located in these areas. But the proportion of schools teaching some conservation is likely to be highest in the Mountain, Pacific, Northcentral, and Southcentral groups of states. The schools teaching conservation are most likely to be located in relatively small centers of population, to be coeducational, to have no religious affiliation, to have either a diversified curriculum or a teacher-training curriculum (teachers' college), and to have an intermediate or large student enrollment, say, 1,000 or more students. By contrast the colleges and universities not teaching conservation are most likely to be located in the Northeastern or Southeastern groups of states, in places with populations of 750,000 or more, to have some religious affiliation and to be supported by private funds, to have either the arts and sciences (or liberal arts) or a specialized-technical (not including the teachers' colleges) type of curriculum, and to have a relatively small student enrollment, say under 1,000, or especially less than 500. Such a list of schools is likely, also, to include a disproportionate number of institutions enrolling one sex only.

were land-grant institutions, offered three courses or less. The work in conservation was most likely to be offered in the fields of natural and agricultural science, with geography a poor third. It was least likely to be offered in the field of education, which accounted for only 2 per cent of the courses.

In the land-grant group, where agricultural science is strongly emphasized, 63 per cent of all conservation courses were offered in that area. Natural science offered 23 per cent. No other subject-matter area accounted for more than 3 per cent. In the other group, natural science led the list with 32 per cent of all conservation courses, and agricultural science was second with 20 per cent. Geography had 19 per cent, physical science and conservation 10 per cent each, social science 9 per cent and education none. Thus, the conservation courses were more widely distributed among these institutions than among those of the land-grant group.

In the land-grant group of schools, the largest proportion of courses (44 per cent) were offered at the undergraduate level. Only 15 per cent of them were offered at the graduate level. The other group apparently followed the same pattern, although one fourth of the courses carried no catalogue specification as to academic level.

Of the 967 catalogue courses examined, 28.5 per cent used the term "conservation" either in the course title or in its description. In all subject-matter areas except social science and education, the land-grant group of schools used the term more often than the other group. For all 86 schools, the subject-matter areas of conservation and geography used the term most often in their course description. Education and social science used the term for half the courses, and physical science and natural science for 20 per cent or less. This suggests that some subject-matter areas emphasize conservation more directly in their teaching than certain other areas.

A total of thirty of these land-grant and large universities offered course sequences leading to an undergraduate major in one or more aspects of conservation. All but two of these schools were land-grant institutions. Schools in the Northcentral and Mountain regions had the most diversified programs, including the major in range management, confined to the Western states. The Northeast and Southeast regions tended to concentrate on wildlife, while no such major was noted on the Pacific Coast. All these majors were technically and occupationally oriented. In only four instances were social science or other nontechnical electives required; in three others they were suggested. Only six schools listed undergraduate majors that could be classified as majors in general conservation.

colleges excelled in this with approximately half of them offering some work along this line.

Summarizing further, it is seen that the 566 schools teaching conservation are most likely to be offering courses in soils, water, and forests, with emphasis upon soils and forests. The work is most likely to be offered in the areas of natural science and/or physical science. No undergraduate major or special degree in conservation will be offered, and characteristically, the conservation subject-matter will be presented only in a few integrated courses (38 per cent), or taught either in special courses only (16 per cent), or in both special and integrated courses (17 per cent). The teaching will be done by one to three teachers, one or two of whom may have had some special training for that purpose. Some visual aids and field trips will be used in teaching. No extension work or special conferences or short courses in conservation will be given. The least likely situations to be found are the teaching of range management and oceanography, or the teaching of conservation in the areas of education or business. Unusual also is the teaching of conservation in both special courses and many integrated courses, and the employment of four or more conservation teachers.

#### LAND-GRANT AND LARGE UNIVERSITIES

Of the 92 institutions investigated by the catalogue method, 51 were land-grant and 41 other large institutions. Geographically, more than half of these schools were of the land-grant type in all regions except the Northeast and Pacific. The land-grant institutions were heavily concentrated in places of less than 50,000 population, whereas approximately half of the other large universities were located in places of 750,000 or over. All except one had curricula of the diversified type. All the land-grant colleges were supported by public funds, but slightly more than one half of the other large schools were supported by private funds, and four of these were church-related. By definition, the nonland-grant schools all had 7,000 or more students enrolled. Among the land-grant schools, only two in five had 7,000 or more students enrolled. Two in five had 4,000-7,000 students, and one in five had fewer than 4,000 students enrolled. The smallest of these schools were located in the Northeast, Southeast, and Mountain regions. All but five were coeducational. These five were operated for male students, but three of them were coeducational at the graduate level.

Six in this group of 92 schools taught no conservation. Only one of these was a land-grant institution. Nineteen, of which only five



prehensive, but a less specific and utilitarian view of conservation than the land-grant group.

### *Teachers of Conservation*

Chapter 6 is concerned with the teachers of conservation—where they are located, and their attitudes and opinions regarding conservation and its teaching. The findings are based upon 626 teachers, located in 566 colleges and universities that were found to be teaching some conservation, who replied to the special teacher questionnaire. As to their distribution, 29 per cent of these teachers were located in land-grant and other large colleges and universities; 35 per cent were teaching in four-year colleges and small universities; 16 per cent in teachers' colleges, 16 per cent in junior colleges, and 3 per cent in special schools. Geographically, this sample of teachers followed the distribution of the colleges and universities in which they function, with a variation of no more than 2 per cent. Half of them were located in schools with diversified curricula, a reflection of the fact that all the land-grant and large universities possessed this type of curriculum, as did three fifths of the junior colleges. Also, 79 per cent of these teachers were employed by schools unrelated to any religious body, and 68 per cent were in schools supported by public funds only. Ninety per cent were working in institutions that were coeducational in nature.

As to size of school, the 626 teachers were heavily concentrated in the larger institutions, principally because the small school usually had but from one to three persons offering any work in conservation. Thirty-six per cent of all teachers responding were located in schools enrolling 2,500 or more students, chiefly in the land-grant schools and other large universities. However, nearly one third (30 per cent) of the conservation teachers located in the 4-year colleges and small universities were teaching in schools with enrollments ranging from 900 to 2,499 students. In the junior colleges, 52 per cent of the teachers were working in schools with fewer than 500 students each. Thus, the distribution of conservation teachers provided another answer to the question, "What kind of schools teach conservation, and to what extent?"

As might be expected, the distribution of course offerings in conservation and of those who teach conservation were highly correlated. Hence, it may be said that the modal group of conservation teachers is to be found in the colleges and universities of the Northcentral states (34 per cent); in those institutions that

Clearly these larger schools are occupied primarily with preparing undergraduates to become conservation specialists. A broad program of teaching some conservation to the entire mass of students enrolled has not yet been realized.

Only ten of these large colleges and universities were offering one or more advanced degrees in some aspect of conservation. Among these, five offered the master's degree in wildlife conservation, and three offered the doctorate. Three schools offered the master's degree in fisheries and wildlife, or fisheries alone, and two offered the doctorate. One institution offered the master's degree in soil and water conservation, and four the same degree in general conservation. Only one offered the doctorate in general conservation. Eight of the ten institutions were of the land-grant type.

It may be assumed on the basis of the data at hand that in the teaching of conservation significant differences separate the land-grant colleges and universities from the other large universities. Each type of school appears to be responsive to the environment in which land-grant schools are located. The former are scattered among the forty-eight states and each feels a responsibility to serve its particular state. Since these schools are located most commonly in relatively small population centers, they appear to be more responsive to the conservation problems of their respective areas. In this respect the colleges of agriculture that form an integral part of each land-grant institution tend to take the lead. Numerous technically-oriented courses bearing upon conservation are offered in these colleges of agriculture, and several of them offer advanced degrees indicating occupational competence in some aspect of the field.

The other large universities, which are located more often in large centers of population, are probably more insulated from the problems arising out of poor conservation of resources. Also, because of diverse connections, means of support, and educational objectives, they may view the teaching of conservation in a somewhat different light. Conservation may tend to be regarded more nearly as a broad cultural subject than as an occupational one. Hence, the courses are more likely to be offered in such fields as geography, physical science, and social science, as contrasted to such applied subjects as agriculture. It appears also that, while the land-grant group employs a relatively intensive approach, relating conservation to specific occupational situations and demonstrating the techniques that are employed therein, the other institutions are more likely to employ a survey approach to the subject. If so, it may be that members of the other group provide their students with a more com-

use," 9 per cent; and "planned use with controls," 8 per cent. There were no great variations in definition among the different types of school except that the teachers' colleges and junior colleges tended to emphasize more than the others the notion of wise use. As to the limits of the expansion of our national economy, nearly 20 per cent thought we would reach the limit within fifty years or less. However, half of them thought the limit was one hundred or more years away, and more than a third thought that our economy could expand indefinitely. Regarding the behavior of the American people toward conservation, nearly half of the teachers thought that we are unnecessarily wasteful; nearly one third thought that we are indifferent, and nearly 20 per cent that we are moderately economical, or most economical. As to the outlook for resource supplies, 55 per cent believed that we shall have temporary shortages, and 27 per cent that we shall have serious shortages. However, 11 per cent felt that we shall have no serious shortages. Teachers in the land-grant and large universities appear to be more tolerant of our behavior toward resources, and more optimistic about the possibilities for future expansion and the outlook for resource shortages. When the responses were classified on the basis of school affiliation, it was found that teachers in the Catholic institutions were far more optimistic regarding the outlook than teachers in the Protestant institutions, with the teachers in schools of no religious affiliation standing about midway between.

As to conservation's lack of popularity, these teachers believe that ignorance of the rate at which our resources are used is the chief factor. Four other factors were mentioned, however. These were "carryover of destructive attitudes of the past," "feeling of irresponsibility for the state of resources," "pressures from industry to consume and discard," and "the belief that science will save us." The replies were highly consistent for all types of institution. As to how to make conservation effective, seven out of ten of these teachers replied that conservation thinking must be made a part of the individual's beliefs. Less than one fourth of them believe that conservation practices can be made effective by means of law alone.

To summarize it may be said that the modal teacher holds the doctorate degree, teaches in natural science, and has a strong interest in conservation, which he defines as the wise use of resources. He feels that, although the economy is capable of expanding indefinitely, we have been unnecessarily wasteful of resources as a people, and consequently temporary shortages will occur in the future until substitutes are found. He believes that conservation is

possess a diversified curriculum (50 per cent); in those having no religious affiliation (79 per cent); in those that are coeducational in nature (90 per cent); and in those schools with student enrollments of 2,500 or more (36 per cent). Conversely, relatively few conservation teachers are to be found in the colleges and universities of the Mountain states (7 per cent of the total); in the schools having specialized curricula (3 per cent); in those schools with religious affiliation (18 per cent), and particularly in those affiliated with the Catholic Church (4 per cent); in schools operated for one sex only (8 per cent); and in those schools with enrollments of 500 to 899 students (16 per cent).

For 52 per cent of the 626 conservation teachers responding to the inquiry, the highest degree held was the doctorate. For 41 per cent, the highest degree held was the master's. These indications of academic training ranked highest in the land-grant and large universities, where 66 per cent possessed the doctorate and 31 per cent the master's degree. They were lowest in the junior colleges, where only 15 per cent of the conservation teachers held the doctorate and 72 per cent the master's degree.

The two general fields of natural science and agriculture claimed about two thirds of the teachers in the sample. Most of them (77 per cent) were concentrated in the three fields of natural science, agriculture, and geography. In the land-grant and other large universities, the largest proportion was found in agriculture.

#### HOW TEACHERS VIEW CONSERVATION

The teachers of conservation appear to be well disposed toward the subject, since only 2 per cent claimed but slight interest in it. By contrast, 69 per cent professed strong interest, and 28 per cent moderate interest. The proportion with strong interest was consistent throughout the various types of institutions, except that in the teachers' colleges it ran 10 per cent higher than the average. Teacher interest was relatively high in Protestant-affiliated schools and considerably lower in Catholic-affiliated. Also, teacher interest in conservation ran relatively high in the fields of conservation, geography, natural science, and education, in the order named. It was lowest in the social science field, and a little higher in physical science and agriculture.

As to definitions of conservation, the replies could be fairly well grouped into five categories, which included 89 per cent of the answers. The most common definitions given were "wise use," 43 per cent; "avoidance of waste and replenishment," 18 per cent; "economic efficiency," 11 per cent; "preservation and frugality of

that all who work with natural resources should receive education in the subject. Thus, teacher sentiment appears to be clearly in favor of teaching conservation to all college students. However, since the teaching of conservation has been done largely in the scientific and technical fields, the question of the appropriateness of conservation for liberal arts students is of interest, and replies on this point were solicited. Half of the teachers believed that conservation is an essential subject for liberal arts students and 39 per cent believed it to be desirable. Only 2 per cent regarded it as non-essential. The response was highly uniform throughout the various types of school. On the basis of the religious affiliation of the schools, the differences were less marked than in some of the categories, but teachers in Protestant schools stood above the average and teachers in Catholic schools below in the matter of urging that conservation be taught to liberal arts students.

Regarding the method of presenting conservation, the teachers favored integrating the subject into related courses, although they approved offering it in special courses also. With regard to the emphasis that should be given to conservation when teaching liberal arts students, approximately two fifths favored presenting the economic, sociological, and educational aspects. This was uniform for all types of school. However, approximately three in ten favored emphasizing scientific theories, current conditions, and historical information. More than one fourth favored emphasizing policies and administration, also.

When teaching conservation to liberal arts students, the teachers believed that student interest might be aroused by relating conservation to the individual interests of those being taught. Other teaching devices suggested were: offering facts regarding conservation, stressing the imminence of resource depletion, and depicting man as a part of the web of life, in the order given. It is clear from the results, however, that the teachers were not wholly committed to any of these particular devices for creating interest.

Thus it may be said that, in terms of modal groups, the teachers of conservation believe that natural science is the best field for teaching the subject, but they believe that social science can contribute also, particularly by way of showing the economic value of conservation. They see the generalist as a person who deals with the economic, sociological, and educational aspects of conservation and believe that his place in the field is rather in dealing with public relations and publicity than in classroom teaching. These teachers believe that conservation should be taught to all students, and that it is an essential subject for liberal arts students. They see it as a

still unpopular because of ignorance of the rate of resource use, and that the way to make conservation effective is to make it a part of the personal habits and beliefs of the people.

#### TEACHER OPINIONS ON CONSERVATION TEACHING

When asked about the importance of the various fields of knowledge in the teaching of conservation, the teachers did not always place their own field first. As a result, although the group placed natural science first in importance, social science came second, and physical science third, with agricultural science fourth. Geography was cited much less frequently. Eighty-eight per cent of all teachers believed that the social sciences have a contribution to make to the field of conservation. The proportion expressing this view was consistent throughout all types of schools. Only 5 per cent believed that the social sciences had no contribution to make to the field of conservation. Regarding the nature of the contribution of the social sciences, however, the teachers were less definite, 29 per cent providing no answer. From 11 to 15 per cent indicated that the social sciences could show the economic value of conservation, provide the basis for social action, show the consequences of the lack of conservation by approaching it historically, and explain the human aspects of conservation. These possible contributions were mentioned in that order of frequency.

As contrasted to the specialist in the field of conservation, more than half of the teachers thought of the generalist as a person who deals with the economic, sociological, and educational aspects of conservation. Thirty-eight per cent of the teachers also believed that the generalist might deal with current and historical information about conservation and, in addition, he might deal with conservation policies and their administration. As to whether the generalist has a place in conservation education, the teacher replies were favorable. More than three fourths of them answered in the affirmative, and the proportion was uniform throughout the different types of school. But as to the major function of the generalist in conservation education, the teachers were not so clear. One third did not answer the question, and one fourth thought that his chief function might be to deal with public relations and publicity. Only 11 per cent believed that he should teach conservation.

When asked who should be taught conservation, three fifths of the teachers replied that all college students should study the subject. This response was uniform among the various types of college. In addition, 42 per cent thought that all prospective teachers should receive education in conservation, and 25 per cent believed

second. General and historical information ranked third in emphasis, with the economic, political, and social philosophy of conservation receiving least emphasis. The different types of school were highly unified with respect to the emphasis placed upon concepts and principles, but were less unified with respect to the other areas mentioned.

As to reported techniques of teaching, there was remarkable uniformity among the various types of school. The most common method was that of lecture and class discussion, with field trips and laboratory work next, in that order. Audio-visual aids came next, followed by student projects and reports. Outside speakers as a teaching device was used least of all.

A review of courses in which some conservation was taught, by general characteristics of the institutions reporting, showed that 83 per cent of the 961 courses reported were being taught in schools with no religious affiliation. Schools with Protestant religious affiliation were teaching 12.6 per cent of the courses, and those with Catholic affiliation 2.2 per cent of the courses. The background of the remaining 2.2 per cent was not determined. There were no considerable differences between the types of conservation course offered by the schools supported by public funds and those supported by private funds, except that the smaller schools tended to offer general courses while the larger schools offered a larger assortment of specialized courses. When classified by size, it was seen that schools with enrollments of 2,500 or more students were offering 39 per cent of all such courses, and those with enrollments of 900-2,499 were offering 26 per cent of the courses. Schools with fewer than 900 students offered only 35 per cent of the courses in conservation, with half of these being offered in schools with fewer than 500 students.

#### CONCENTRATED CONSERVATION COURSES

Of the 961 courses reported by the teachers as possessing some conservation content, 224 were classified as concentrated courses. This was done because the term "conservation" appeared in the title of the course and it was assumed, therefore, that the subject was given an important place in the course. The nature and distribution of these courses is of some interest. Of these 224 courses, one third were offered by land-grant and large universities, one third by 4-year colleges and small universities, 27 per cent by teachers' colleges, and the remainder by junior colleges and specialized schools. These courses may be classified into five types,

subject integrated into related courses, although they do not reject special courses. They feel that the sociological and educational aspects of the subject should be emphasized, and that, in order to stimulate interest, these aspects of the subject should be related to the individual interests of the student.

### *Conservation Courses Offered*

The 626 teacher respondents reported that they offered 961 courses in which some conservation was taught. This amounted to an average of 1.5 courses per teacher. However, 11 per cent of these respondents failed to provide a list of the courses taught, and, hence, the following summary is based upon the lists supplied by 557 teachers. Ninety-seven per cent of the courses were said to be offered every academic year. Most of them offered at the undergraduate level, though graduate students were permitted to enroll in 17 per cent of them. Only 7 per cent of the courses were offered for graduate students only, and these were given mostly in the land-grant and large universities and the teachers' colleges.

Approximately two fifths of the conservation courses enrolled fewer than 20 students. Sixty-one per cent enrolled fewer than 40 students, and only 18 per cent enrolled 60 or more. The teachers' colleges enrolled the largest number of students per course, while the land-grant and large universities group enrolled the smallest number per course. Teachers generally devoted either all of the course time to conservation, or less than one fifth of the time. Only 19 per cent devoted from 20 to 60 per cent of the course time to conservation. This distribution of time was fairly consistent for the various types of school, although the junior colleges devoted less course time to conservation than other types of school. In these colleges, an average of less than 20 per cent of the course time was devoted to conservation.

As reported by the teachers, the aspects of conservation taught agreed closely with the report of administrative officers. According to their catalogues, the land-grant and large universities, for which no administrative report was obtained, deviated to some extent from the other types of institution. The mean line of trend for all institutions showed a steady decline of emphasis from soils, water, and forests through ecology, economics, wildlife, and grasslands, ending with least emphasis on fish, minerals, and limnology, in that order. The major emphasis was reported to be upon concepts and principles, with skills and techniques of management



common among the land-grant and large universities where approximately one fourth offered that many. Among the other types of school, 6 per cent or less of the teachers offered three or more courses. Approximately three fourths of the teachers offered only one such course.

The most common type of concentrated conservation course was the one entitled "Conservation of Natural Resources." Forty-two per cent were of this type; and if to that is added all courses using "conservation" in the course title, the percentage rises to 62 per cent. These concentrated courses amounted to 23.3 per cent of all conservation courses offered. Thirty-eight per cent of them were offered in the natural science area and they involved 32.8 per cent of all conservation teachers, 68 per cent of whom offered only one course.

### *Administrative and Teacher Evaluation of Conservation Programs*

Both the questionnaires sent to administrators of colleges and universities and the one sent to the teachers of conservation in these same institutions contained certain questions bearing upon the scope and quality of the conservation programs offered. That is, they were questions that were calculated to bring out evaluative judgments concerning the work in conservation offered by the respective institutions. They also sought statements that would reveal attitudes bearing upon the introduction of the subject into the curriculum, or some expansion of the program if the subject was already being taught. These questions apparently possessed little interest for the 458 schools teaching no conservation. At any rate fewer than half of the administrators in this group answered the questions, feeling, perhaps, that such questions did not apply to them. Of those that did reply, few regarded the institutional library as adequate for the teaching of conservation. The general impression obtained from reading these replies was that a lack of interest in the field of conservation prevailed. Few of those not teaching the subject reported any plans for introducing it into the curriculum.

### *VIEWS OF ADMINISTRATORS IN SCHOOLS TEACHING CONSERVATION*

As to the adequacy of the conservation programs offered by those institutions teaching some conservation, only 39 per cent of the administrators of these schools thought their programs were adequate. Forty-four per cent thought their programs inadequate.

namely, conservation of natural resources, 42 per cent; special resources, 27 per cent; conservation, 20 per cent; conservation education, 6 per cent; and conservation workshop, 5 per cent. The first and third of these categories are virtually the same and may be combined, making 62 per cent of the total number of courses. The land-grant and large universities offered far more courses in special resources than any other type of school. The 4-year colleges and small universities tended to specialize in the more general course, as did the teachers' colleges. Junior colleges ran particularly to courses dealing with special resources and to conservation workshops.

These concentrated courses varied greatly with respect to their numerical importance among the different types of school. For all schools taken together, they comprised 23.3 per cent of all courses containing some conservation teaching, but in the teachers' colleges they constituted 40 per cent of all courses containing some conservation, and in the 4-year colleges and small universities they constituted 27 per cent of all such courses. In the land-grant and large universities, concentrated conservation courses accounted for only 21 per cent of all conservation courses, and in the junior colleges, only 6.5 per cent. These concentrated courses were offered principally in the areas of natural science (38 per cent), geography (27 per cent), and agriculture (18 per cent). The proportion of courses offered in all other areas varied from 2 to 8 per cent, except in the case of the 4-year colleges and small universities, where a higher proportion of the courses were given in natural science and geography. The same held true for teachers' colleges. In the junior colleges three fourths of these courses were given in the field of natural science. Likewise, the number of teachers offering concentrated conservation courses varied greatly among the various types. In all schools taken together, one third of the respondents offered one or more such courses. However, in the teachers' colleges, half of the teachers offered one or more such courses and the corresponding proportion in the land-grant and large universities was 40 per cent. In the 4-year colleges and small universities, slightly less than one third (31.3) offered such courses, while in the junior colleges, the proportion amounted to only 7 per cent. Looking closer we find that 68 per cent of all teachers reporting offered only one concentrated course in conservation. Eighteen per cent offered two courses, 8 per cent three courses, and 6 per cent four or more. Teachers offering three or more courses were much more

## OPINION OF TEACHERS IN SCHOOLS TEACHING CONSERVATION

The teachers' evaluations of their college programs in conservation education are not strictly comparable with those made by the college administrators since the former group includes the evaluations of teachers employed in the land-grant and large universities. Administrators in these schools did not receive the administrative questionnaire. Furthermore, not all the teachers employed in those institutions returning the questionnaires answered the teacher questionnaire; and, of those replying, not all answered the questions concerning program evaluation. The percentages reported here are based upon the statements of those replying.

Nearly 60 per cent of the teachers returning their questionnaire gave some appraisal of the quality of the programs in their respective institutions. Fifteen per cent rated the program good to excellent, 19 per cent reported it fair, and 24 per cent called it poor or insufficient. These proportions varied with the type of school, the instructors in the land-grant and large universities and in the teachers' colleges rendering more favorable judgments than the teachers representing the four-year colleges and small universities, and the junior colleges. Teachers representing schools with no religious affiliation were four times as likely to appraise their programs as good or excellent as were the teachers in religious-affiliated schools. Teacher evaluation of the work in conservation education also varied with school enrollment, the programs in the larger schools being given the higher evaluations. A variation was also noted among teachers functioning in the different subject-matter areas. Conservation teachers in the field of agriculture regarded their programs more favorably than did conservation teachers in the field of physical science. Also, the teachers of geography and education regarded their work in conservation more favorably than did the teachers in the fields of natural science and social science. In all types of school, teachers professing a strong interest in conservation tended to rate their programs higher than teachers professing only a moderate or slight interest in the subject. And finally, teachers who were optimistic about the resource outlook for the future rated their conservation teaching programs higher than did those teachers who possessed a pessimistic view of the future.

Approximately two thirds of the teachers of conservation felt that the emphasis given to the subject in their respective institutions was insufficient. The proportion was highest (72 per cent) in the four-year colleges and small universities. Teachers in the

These percentages were fairly uniform by type of school, except for the junior colleges where only 28 per cent believed their conservation teaching to be adequate. The size of the school had little influence on this judgment. Catholic administrators appeared to be better satisfied than the average. Nearly half of the Catholic schools believed their conservation teaching to be adequate, and only one fourth felt that it was inadequate. The profile of schools reporting satisfaction with their conservation programs was as follows: four-year colleges and small universities, 42 per cent; schools with specialized curricula, 40 per cent; schools with student enrollments under 500, 39 per cent; schools affiliated with the Catholic church, 47 per cent; those supported by private funds, 43 per cent; and those operated for females only, 57 per cent. Conversely, the profile for schools reporting that they believed their conservation teaching to be inadequate yielded these percentages: junior colleges, 58; schools with diversified curricula, 53; schools with student enrollments under 500, 43; schools with no religious affiliation, 42; and those enrolling both sexes, 43.

As to the improvement of their conservation programs, two thirds had no plans either for expansion or improvement in quality. The teachers' colleges and junior colleges showed greatest interest, but even among them less than one third reported more or less definite plans. The plans most often reported involved adding more courses to the curriculum, revising present courses, and offering summer courses or workshops. More than half of those replying claimed some assistance would be necessary to make these improvements. The teachers' colleges were most desirous of such assistance, and the most common request was for teaching aids and help with curricular developments. However, a variety of other types of needed assistance was mentioned.

Thus it may be said that, of the schools teaching conservation, 44 per cent considered their teaching to be inadequate, and 47 per cent considered their library to be inadequate for the purpose. Sixty-six per cent had no plans for improvement, however, but 12 per cent planned to add new courses. Fifty-six per cent felt that some assistance from the outside was necessary for expansion, and 33 per cent needed teaching aids and curricular development for such expansion. Among the schools doing no conservation teaching, 19 per cent felt that conservation should be included in the curriculum, 24 per cent believed the library to be inadequate for the purpose, 47 per cent had no plans for improvement, and only 10 per cent were interested enough in the matter of assistance to comment on it.

### *Program Levels in Conservation Education*

In Chapters 5-8, the analysis of programs in conservation education now being offered in the colleges and universities of the United States is presented in terms of the configurations of certain variable factors, which are related to certain institutional characteristics, such as their size and the source of their financial support. It is believed that from this analysis the reader may learn how programs in conservation education tend to vary among the several types of educational institutions. Chapter 9 was added to provide a collective picture of all those schools offering only meager programs in conservation, as contrasted to all those institutions offering the more elaborate programs. In order to do this, the schools were assigned scores on the basis of the size and scope of their conservation offerings. The scoring device was developed from Questions 6-13 of the administrative questionnaire (see the Appendix). The schools were then divided into High, Medium, and Low score groups. Only 390 of the 566 institutions offering some work in conservation could be scored and grouped in this manner since no administrative questionnaire was obtained from the land-grant and other large universities, and since some of the smaller institutions failed to answer fully Questions 6-13.

The 390 institutions thus scored consisted of 197 four-year colleges and universities, 85 teachers' colleges, and 108 junior colleges. Although the scores thus assigned to each institution must not be thought of as providing a reliable measure of the conservation program offered by each institution, the authors believe that their use in creating three broad subgroups for the study of certain limited characteristics of the institutions is justifiable. Subsequent visits to a number of these institutions to check the accuracy of the questionnaire returns showed them to be substantially correct as far as they went. However, it appeared from these visits that if the questionnaire had been more extensive the differentiation of institutions would probably have been wider though not necessarily different as to relative placements. The reason is that the position of the schools with the better programs tended to be somewhat underrated when based only upon the six questions of the administrative questionnaire, while that of the schools with the poorer programs tended to be relatively overrated. Hence, the distance between the top-rated schools and the bottom-rated schools would appear to be somewhat greater than the scores provided would

various subject-matter areas did not differ greatly from each other in this view, but they did differ markedly when classified by religious affiliation of their school. Conservation teachers working in schools with Protestant religious affiliation were most emphatic, while those working in schools with Catholic religious affiliation were least emphatic concerning conservation emphasis. Seventy-three per cent of the former and 54 per cent of the latter claimed that conservation was not receiving enough emphasis. The corresponding proportion for teachers in schools with no religious affiliation was 64 per cent. Thus, although the teaching of conservation in schools with some religious affiliation generally lagged behind such teaching in schools with no religious affiliation, it appears that those teachers functioning in Protestant-affiliated schools were more keenly aware of the need for more and better conservation education than were the teachers in Catholic-affiliated schools, and perhaps more so than teachers in schools with no religious affiliation. However, it should be remembered that the schools with no religious affiliation included the land-grant colleges and universities, where the teaching of conservation is most advanced in its development.

Suggestions for the improvement of programs in conservation education were remarkably uniform among the teachers in the various types of school. More course emphasis and better integration of departmental programs led the list. Better teachers and more required courses, as well as new courses, were often mentioned. One fourth of the respondents, especially those in junior colleges, believed that more visual aids were most needed. The small schools, generally, were more concerned with teaching aids, field trips, visiting lecturers, and better literature. The larger institutions were more interested in obtaining scholarships and research support.

Thus, it may be said that these evaluations revealed the teachers to be decidedly critical of current programs for conservation education, although many declined to offer an opinion. The large institutions, where the subject was best developed, were least critical, and the four-year colleges and small universities most critical. The teachers' colleges recommended more required courses. Although the categories were not strictly comparable, it appears that the conservation teachers were more critical of current programs than were the administrators of the institutions employing them. With respect to improvement, these teachers seemed to be more interested in elaborating existing strength than in eliminating the known weaknesses in their current conservation programs.

subject areas involved is likely to vary somewhat with the number of teachers.

More than nine out of ten of these high scoring schools make use of visual aids and field trips as teaching devices and more than three fourths employ special laboratory work and visiting lecturers. About nine out of ten regard their library as adequately equipped for conservation teaching. Three out of ten offer some extension work.

Nearly two fifths of these schools have administrators who believe their present programs of conservation education to be adequate. Only one fourth of the administrators in the four-year colleges and small universities thought their conservation programs were definitely not adequate, but in the teachers' colleges one in three thought them inadequate.

As to measures for improving their programs in conservation education, nearly half of these high-scoring institutions reported plans for such improvement. Eighty-six per cent expressed themselves in favor of some sort of assistance to help improve their programs in conservation education. Administrators in the teachers' colleges and junior colleges seemed to be more interested in some such assistance than those in the four-year colleges and small universities.

The Low group included 119 institutions, all scoring below 30. The group was composed of 71 four-year colleges and small universities, 10 teachers' colleges, and 38 junior colleges. As to location, 58 per cent are located in the Northern states, nearly one third in the South, and one in ten in the Western states. Nearly two thirds of these institutions are located in places of less than 25,000 population and 81 per cent in places of less than 100,000 population. The modal group of these Low institutions is composed largely of small schools; 55 per cent of them had fewer than 500 students enrolled at the time of this survey, and 76 per cent had fewer than 900 students. One in 12 had as many as 2,500 students, and only one in 30 had as many as 4,000 students. The predominant type of curriculum is arts and sciences, or liberal arts, 57 per cent being of that sort. Only one in four has a diversified curriculum. The others all have specialized curricula, a few of them being schools of education. These schools are 85 per cent coeducational. Nearly seven out of ten are privately supported institutions and almost one third are supported by public funds. Half of these schools are church-related, 39 per cent being Protestant and 12 per cent Catholic.

suggest. However, from the standpoint of the comparisons made herein, this difference appears to be unimportant.

When completed, the numerical scores of the 390 institutions ranged from 11 to 79 on a scale ranging from 0 to 100. The median of the distribution was 36.7. The four-year colleges and small universities had scores ranging from 11 to 79 with a median of 34.9. The teachers' college scores ranged from 15 to 78 with a median of 44.8, and the junior college scores from 11 to 58 with a median of 34. Following certain breaks in the distribution, the cutting points were set at 30 and 50. Thus, the Low scoring group had scores below 30, the Medium group scores ranging from 30 to 49, and the High group scores of 50 or over.

A brief review of the high-scoring group, which includes 73 institutions, would necessarily stress the following characteristics. These institutions are most likely to be found in the Northern states and three fourths are to be found in either the Northern or the Southern states. Nearly three fourths are located in places of less than 25,000 population and only 6 per cent are found in places of 400,000 or more population. These schools are overwhelmingly coeducational (86 per cent) and nearly half (45 per cent) operate a specialized curriculum, including education. Only one in five are of the liberal arts or arts and sciences sort. More than four fifths (82 per cent) are not church-related. These high-scoring schools vary greatly in enrollment although not many of them are really small in size. Only 15 per cent had fewer than 500 students and nearly one in five had 2,500 or more students enrolled. Only five of these schools offered a special degree in conservation, but one in five offered an undergraduate major. Seventy-three per cent of these schools offered conservation both in special courses and integrated courses. Only one school offered the work solely through special courses.

The number of teachers offering the work in these high-scoring schools is not less than two, and it is likely to be five or more, since two thirds of the schools had that many. Half of the four-year colleges and small universities had six or more teachers of conservation and no junior college had less than four. The number of aspects of conservation taught is likely to be seven or more. Three fifths of the schools taught minerals, soils, water, wildlife, forests, ecology, and recreation. Nearly half of them offered work in range management and a number offered oceanography. This work in conservation education is most likely to be offered in the areas of natural science, physical science, and geography, and least likely to be offered in physical education and business. The number of



women's colleges. As to enrollment, more than one third have fewer than 500 students, and 59 per cent fewer than 900 students. Only 12 per cent have 2,500 or more students, and seven out of ten possess no church connection.

At the time of the survey, the number of persons teaching conservation was as likely as not to be two or three, although 78 per cent had one to four. Twenty-two per cent had five or more teachers, and seven per cent had seven or more teachers of conservation. Forty-five per cent of the schools offered only integrated courses, and 17 per cent special courses only. Thirty-seven per cent offered both. Only one in twenty offered an undergraduate major in conservation, and only one school offered a special degree in conservation.

The aspects of conservation taught were most likely to be soils, minerals, water, forests, and wildlife, in that order. These schools were least likely to be offering work in recreation, range management, and oceanography. Ninety-three per cent of the schools used visual aids and field work in teaching conservation and more than half employed special laboratory work and visiting lecturers. Three fifths believed their libraries to be entirely adequate for the work done, and only 15 per cent felt that they were definitely not adequate. Administrators in this group believed their programs to be adequate in 55 per cent of the cases; but 38 per cent believed their programs were inadequate. Nearly one third (31 per cent) of the administrators claimed to have some plans for the improvement of their programs. This was approximately average for the total of 390 schools scored. Four out of five of the schools expressed an interest in receiving some assistance in improving their conservation programs.

In 1954, none of these schools offered an undergraduate minor in conservation, and only one in 60 offered an undergraduate major. None offered a special degree in conservation. Three fifths of the Low scoring schools offered their work in conservation education chiefly by means of a few integrated courses. Only seven per cent offered both special and integrated courses. These schools generally had from one to three teachers offering work in conservation. Approximately one third had one teacher, one third had two teachers, and a total of 91 per cent had not more than three teachers of conservation. These teachers were most likely to offer work in soils, water, forests, and minerals; and the courses were most likely to be offered in the field of natural science and physical science.

Four out of five of these schools used visual aids in teaching conservation and three out of four used field trips as a teaching device. Only two in five used special laboratory work and one in four visiting lecturers. Ninety-two per cent offered no extension work, short courses, or workshops in conservation. Three out of five of these schools judged their libraries to be inadequate for conservation teaching and only 18 per cent believed them to be wholly adequate. Two thirds of the administrators reporting believed their programs to be inadequate and only eight per cent believed them to be entirely adequate.

More than two thirds of the administrators in this group reported no plans for expanding their work in conservation. Only 23 per cent had such plans. More than two thirds of the group claimed that they needed assistance for any expansion of their conservation teaching.

The Medium score group, with a scoring range of 30-49, possesses a profile that by definition falls between those of the High score group and the Low score group. However, since all factors considered were not correlated, some of these schools deviate slightly in certain respects from what would normally be classified as intermediate.

This Medium group is composed of 198 colleges and small universities, half of which are located in the Northern states. Slightly fewer than one third are in the Southern states, and one fifth in the Western states. The four-year colleges and small universities and the teachers' colleges are concentrated in the Southern states while the junior colleges are heavily represented in the Western states. As to size of place where located, 78 per cent are found in places with less than 50,000 population, and only 15 per cent in places of 100,000 or more. Two thirds are in places of less than 25,000 population. Eighty-five per cent are coeducational, and 13 per cent are

institutions, and doubtless competent leadership could hasten the maturity and implementation of some of these plans.

*Third*, it seems unlikely that within any predictable period of time all the colleges and universities in the United States will be offering a program of conservation education. In some schools, the predominant view appears to be that conservation has no legitimate place in the curriculum of an institution devoted to the liberal arts. In others, it is felt that the curriculum should be modified in response to student demand, but that the institution should be slow to make curricular changes or additions for which there is no apparent demand. In still other institutions, it is believed that conservation education consists primarily of the training of occupational specialists, and that such work should be delegated entirely to the special professional schools. Related to these attitudes is the fact that the proportion of conservation-teaching schools interested in expanding their current programs appears to be greater than the proportion of nonteaching schools interested in adding conservation to their curricula. Also, it appears that, in the aggregate, the institutions with the better developed conservation programs are more interested in improving their programs than are the schools with less well developed programs. This suggests that in the course of time a somewhat greater differentiation of colleges and universities than now exists may come to pass with respect to their offerings in conservation education.

*Fourth*, it is apparent that a large proportion of the students enrolled in the colleges and universities of the United States are never exposed to even one course in conservation during the period of their college career. The widest coverage probably occurs in the teachers' colleges, but even there it is limited. A number of factors conspire to bring this about, even in institutions where conservation is taught. Courses in the subject are usually taught in scientific departments. Such courses are not required of all students; indeed they may have sufficient prerequisites so that few students qualify for admittance. Conservation is commonly thought of as a technical subject of interest chiefly to the scientist and conservation specialist. There is some evidence to support the view that student behavior today is away from science, and the failure of the social sciences and humanities to incorporate conservation into their teaching means that large numbers of college students never become aware that the subject possesses any significance for them, or for the population generally.

Clearly, if conservation deserves an important place among our national policies, as many are inclined to believe, it also deserves a

# 11

## IMPLICATIONS AND RECOMMENDATIONS

### *Some Implications*

From this brief summary of the status of conservation education in colleges and universities of the United States, a number of conclusions and inferences may be drawn. *First*, the incidence of some sort of conservation education in the colleges and universities is still far from general, and its occurrence, or lack of occurrence, appears to be related to a number of factors some of which are environmental (such as geographic area and size of place where the institution is located), and some of which are inherent in the nature of the institution (such as size of institution and source of financial support). Furthermore, among those institutions where some sort of conservation education is offered, there is great variation in the scope and extent of the program, a matter somewhat related—but not at all closely—to the size or apparent resources of the institutions involved. Both incidence and extent of conservation education vary greatly among different types of institution, the teachers' colleges and the land-grant colleges and universities leading the way in both respects. However, a certain number of other large universities are recognized leaders in the field.

*Second*, there evidently exists a certain degree of interest in conservation education among both teachers and administrators, in non-participating institutions as well as those now teaching conservation. This interest might easily become the basis for expanding the teaching of conservation if competent leadership were available further to stimulate and guide those now expressing interest. Plans for expansion are reported to exist in an appreciable number of

Furthermore, it appears likely that no opposition would be encountered from those now carrying the principal burden of conservation teaching. Among the 626 conservation teachers interrogated on the subject, 88 per cent believed that social scientists have a contribution to make in the field of conservation education. This group of teachers was composed largely of persons teaching in the fields of physical and biological science. Perhaps when it becomes more generally recognized that conservation education consists of more than a set of field skills for the occupational specialist, and that conservation, and conservation education, involves a considerable segment of our habitual behavior and our historical culture, the social scientists may develop a greater interest in the subject.

*Sixth*, a condition worthy of some concern is the widespread confusion regarding the meaning of conservation. With respect to the general population, this situation has been known and remarked by writers on the subject for some time. The present study seems to show that a similar confusion occurs among the teachers of conservation in the colleges and universities. The problem is not that differences of opinion occur which represent a normal situation. Rather, it is that a considerable proportion of these college teachers have apparently adopted popular clichés as working definitions of conservation when they might be expected to offer something more scientific in nature, considering the fact that such a high proportion of them teach and have their basic training in some scientific field.

The concept of conservation is in dire need of clarification and more precise definition. Furthermore, a definition is badly needed that indicates a positive approach to the problems of resource use as contrasted to the negative approach so commonly visualized by the public mind. The negative approach sounds too much like hoarding to appeal strongly to the youth of today, who are bombarded from every angle with stimuli to consume. Moreover, when conservation is presented simply as "wise use" of resources (the definition offered by 43 per cent of the teachers responding), it is likely to arouse little interest in students because of the abstract nature of such a concept, and because it is difficult to visualize any long-time program based upon it. Unless conservation can be described more directly in terms of things to do, and practical reasons for doing them, the subject is not likely to become a vital element in the habits of thought and action of any large proportion of college students, even though they may have been exposed to a course in the subject. As a result of study a more precise and posi-

place in general education. There can be no discounting the importance of the conservation specialist. The history of the conservation movement in the United States shows that the beginnings consisted of the training of conservation specialists in response to the growing demand that something be done to conserve the declining resources; through the skill of these specialists, backed by administrative support, conservation practices were put into operation, and soon came to be accepted as a part of the normal social order. But under present circumstances these conservation practices, however well they may have been established at one time or another, do not automatically remain in force. Without effective conservation teaching in general education, the public tends to lose sight of the value of the conservation practices it already enjoys, and the battle for retention of them must be refought in every generation. It is true that conservation teaching in the elementary schools is gradually becoming general, although it seems to be less evident in the secondary schools. But, while conservation education at these levels is extremely valuable, it must be presented, particularly at the elementary level, in terms of simple skills and concepts that may easily lead to erroneous ideas of conservation philosophy and policy. A mature view of the subject should be presented, and this can be done most effectively at the college level. The steadily increasing proportion of American youth who obtain some college education, together with the fact that, more and more, the industrial, professional, and political leadership of the nation is drawn from the ranks of college graduates, strongly suggests that conservation teaching of a high order should be included in general education at the college level.

*Fifth*, social scientists might well give more attention to the field of conservation. So far in this country, the conservation movement has been initiated and guided chiefly by physical and biological scientists, with the geographers making a notable contribution. Among the social scientists, only the economists have displayed an abiding interest.

Yet the problems of resource use have their historical, political, and sociological aspects. They involve principles of human behavior, both sociological and psychological; also institutional problems, community problems, and governmental problems. These are aspects of the problems of resource use with which the social scientists are competent to deal, and if they chose to do so, far more students at the college level could be reached than is now the case. The social sciences now have a growing popularity among college students, and large numbers of them take courses in these fields.

trained teachers and to improve the training of those now teaching the subject.

5. Most conservation education is now being offered by the land-grant colleges and universities, and a few other large universities plus the teachers' colleges. The former offer the work chiefly in connection with professional courses, or other courses for specialists. The latter are training teachers chiefly for the elementary and secondary schools. The problem of getting conservation included in the curriculum for general education at the college level has scarcely been touched. Here is a large field in need of attention. Plans should be developed with a view to solving this problem.

6. Social scientists have contributed relatively little to education in conservation. Mostly, conservation has been taught within the framework of the natural and physical sciences, or the applied aspects of these, such as agriculture. A high proportion of college students is never exposed to a conservation course offered in one of these fields. Clearly, much would be gained if the social sciences (in addition to geography and economics, both of which are active now) became more interested in offering such courses. Such courses would no doubt emphasize the historical, philosophical, and social significance of conservation. One or more good texts written from this point of view should be helpful in promoting more conservation courses in general education.

7. *Several good monographs from the historical point of view* could and should be produced for showing the historical evidence. By the social significance of conservation practices, or lack of them, these could be a great help to the social scientist attempting to teach conservation.

8. Conservation makes little sense when separated from the concepts of time and population. A good monograph on the relationships prevailing among the factors of population growth, natural resources, and the level of the productive arts is needed and should be well received.

tive definition has been proposed, which the authors hope may be found useful.

*Seventh*, in the field of conservation education, the population aspects of the problems of resources and resource use need more attention. Students should become acquainted with the rates of population change, both growth and decline, the factors affecting them, and the experience of those peoples who have permitted their population to exceed the capacity of their resources to support them at their prevailing level of the productive arts. They should come to understand that in the long view conservation involves a balance between population increase on the one hand and the supply of known resources, together with the current technology of resource utilization, on the other.

### *Some Recommendations for Action*

1. Only slightly more than half of the colleges and universities of the United States are now teaching conservation. This figure is more than proportionally weighted in favor of the large publicly supported schools located in the smaller places throughout the nation. An action program is needed to aid and encourage the other institutions (which are on the average smaller, privately supported, and located in the larger cities) to incorporate conservation in their teaching programs.

2. Many of the schools now teaching some conservation recognize the inadequacies of their programs and express some desire to improve them; yet they appear not to be well informed regarding the aids to teaching and other forms of assistance now available. A better communication service with these institutions, in regard to teaching aids and other forms of available assistance, would probably be used by them to good advantage.

3. Many of the colleges not now teaching conservation express interest in adding the subject to their curricula. However, they indicate a need for help on curricula and teaching problems. The preparation of a good text for a first course in conservation—one that deals more with philosophy and social significance than with technology—should be helpful to these institutions.

4. The number of well-prepared teachers of conservation is probably not adequate to supply any large demand. A very significant proportion of those now teaching conservation are reported to be untrained for the work and probably expansion of conservation teaching to additional institutions would serve to increase the proportion of untrained teachers. Action is needed to provide more



## *Appendix*

Survey of Programs in Conservation Education

Fill out and return to C. E. Lively  
University of Missouri, Columbia, Mo

Code

- ☐ 1. Name of Institution \_\_\_\_\_; Location \_\_\_\_\_
- ☐ 2. Type of Institution: University\_\_\_\_; 4-Year College\_\_\_\_; Junior College\_\_\_\_; Teachers College or Normal School\_\_\_\_; Military Academy\_\_\_\_; Other\_\_\_\_.
- ☐ 3. Chief source of financial support: Public funds\_\_\_\_; Private funds\_\_\_\_.
- ☐ 4. Total enrollment, 1953-54 \_\_\_\_\_. 5. Co-Educational: Yes\_\_\_\_; No\_\_\_\_.
- ☐ 6. Check any of the following aspects of resource conservation that are taught to resident students in this institution. (Double-check those especially emphasized) Minerals\_\_\_\_; Soil\_\_\_\_; Water\_\_\_\_; Forests\_\_\_\_; Wildlife\_\_\_\_; Range Mgt.\_\_\_\_; Recreational\_\_\_\_; Oceanography\_\_\_\_; Ecology\_\_\_\_; Other\_\_\_\_; None\_\_\_\_.  
(If answer to Item 6 is "None," omit Items 7, 8, 9, 10, & 11)
- ☐ 7. List the departments in which the above subjects are taught: \_\_\_\_\_  
\_\_\_\_\_
- ☐ 8. Do you offer: (a) an undergraduate major, Yes\_\_\_\_; No\_\_\_\_; or (b) a special degree, Yes\_\_\_\_; No\_\_\_\_; in conservation?
- ☐ 9. Is conservation instruction given (a) in special courses?\_\_\_\_, (b) integrated into a few courses?\_\_\_\_, (c) integrated into many courses?\_\_\_\_
- ☐ 10. Approximately how many teachers participate in this teaching?\_\_\_\_  
How many have had special training for such teaching?\_\_\_\_
- ☐ 11. Which of the following teaching aids are used in teaching conservation? Special laboratory work\_\_\_\_; field trips\_\_\_\_; visual aids\_\_\_\_; visiting lecturers\_\_\_\_.
- ☐ 12. Is the library adequately supplied with conservation materials?\_\_\_\_
- ☐ 13. Does this institution offer any extension teaching in conservation, or hold any conferences or short courses? If so, explain: \_\_\_\_\_  
\_\_\_\_\_
- ☐ 14. Do you believe that current teaching of conservation in your institution is adequate? \_\_\_\_\_
- ☐ 15. Do you have plans for expanding the teaching of conservation in your institution in the near future?\_\_\_\_ If so, along what lines? \_\_\_\_\_  
\_\_\_\_\_
- ☐ 16. What sort of assistance, aids, or stimulation would be most helpful in promoting more and better teaching of conservation in colleges and universities? \_\_\_\_\_  
\_\_\_\_\_
17. List name and department of faculty members who may give further information.
- | <u>NAME</u> | <u>DEPARTMENT</u> |
|-------------|-------------------|
| _____       | _____             |
| _____       | _____             |
| _____       | _____             |
18. Name of person answering this questionnaire: \_\_\_\_\_ Official position: \_\_\_\_\_  
\_\_\_\_\_

13. What subject matter, or fields of learning, if any, do you consider most important from the standpoint of teaching conservation of natural resources?  
 \_\_\_\_\_ Why? \_\_\_\_\_  
 \_\_\_\_\_
14. Do you believe that the social sciences (e.g., anthropology, sociology, and economics) can make an essential contribution to conservation education? Yes \_\_\_ No \_\_\_ If so, what? \_\_\_\_\_  
 \_\_\_\_\_
15. As contrasted with a specialist in the field of conservation, a "generalist" is a person whose chief interest and concern is: (More than one answer is acceptable.)  
 \_\_\_ a. Current and historical information about conservation.  
 \_\_\_ b. The economic, sociological, and educational aspects of conservation and its problems.  
 \_\_\_ c. The scientific theories and concepts underlying conservation practices.  
 \_\_\_ d. Conservation policies, and the political and administrative aspects of their realization.  
 \_\_\_ e. The coordination of the skills and techniques of conservation practices.  
 \_\_\_ f. Other \_\_\_\_\_  
 \_\_\_ g. No opinion.
16. As you define him, do you believe the "generalist" has a place in conservation education? Yes \_\_\_ No \_\_\_. If "yes," what? \_\_\_\_\_  
 \_\_\_\_\_
17. Considering conservation as a college subject, to whom should it be taught?  
 \_\_\_ a. All who major in science.  
 \_\_\_ b. All who plan to work with natural resources  
 \_\_\_ c. All who take science courses.  
 \_\_\_ d. All prospective college teachers.  
 \_\_\_ e. All prospective teachers, regardless of grade to be taught.  
 \_\_\_ f. All college students.
18. Do you consider conservation a. a nonessential \_\_\_, b. an appropriate \_\_\_, c. a desirable \_\_\_, d. an essential \_\_\_ subject for liberal arts students?
19. For most effective results, how should conservation be presented to liberal arts students? a. In special courses \_\_\_, b. Integrated into related courses \_\_\_, c. Integrated into both related and unrelated courses \_\_\_, d. In as many different ways as possible \_\_\_\_.
20. If offered to liberal arts students, which of the following aspects of conservation would you emphasize? (Rate selections in order of importance.)  
 \_\_\_ a. Current and historical information about conservation.  
 \_\_\_ b. The economic, sociological, and educational aspects of conservation and its problems.  
 \_\_\_ c. The scientific theories and concepts underlying conservation practices.  
 \_\_\_ d. Conservation policies, and the political and administrative aspects of their realization.  
 \_\_\_ e. The coordination of the skills and techniques of conservation practices.  
 \_\_\_ f. Other \_\_\_\_\_

## SURVEY OF PROGRAMS IN CONSERVATION EDUCATION

Questionnaire to College Teachers

Fill out and return to C. E. Lively  
University of Missouri, Columbia, Mo.

Please feel free to use backs of question sheets for answers requiring added space.

1. Name \_\_\_\_\_ 2. Institution \_\_\_\_\_
3. Department \_\_\_\_\_ 4. Highest Degree Held \_\_\_\_\_
5. Your field of special interest and training \_\_\_\_\_
6. How would you classify your interest in conservation education?  
a. Strong \_\_\_\_, b. Moderate \_\_\_\_, c. Slight \_\_\_\_, d. None at all \_\_\_\_.
7. What is your conception, or definition, of conservation as applied to natural resources? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
8. How much longer can the American economy reasonably be expected to expand?  
a. 50 years \_\_\_\_, b. 100 years \_\_\_\_, c. 200 years \_\_\_\_, d. Indefinitely \_\_\_\_, e. Has already reached its limit \_\_\_\_, f. Other (specify) \_\_\_\_\_, g. No opinion \_\_\_\_.
9. With respect to resource use, how would you characterize the habits and customs of the American people? They are: a. Unnecessarily wasteful \_\_\_\_, b. Indifferent toward economical use \_\_\_\_, c. Moderately economical \_\_\_\_, d. Most economical, considering the circumstances \_\_\_\_.
10. With respect to future resource supply, how do you view the outlook?  
\_\_\_\_ Serious shortages tending to restrict industry and to lower levels of living.  
\_\_\_\_ Temporary shortages until adequate substitutes can be found.  
\_\_\_\_ No serious shortages.  
\_\_\_\_ Other (specify).  
\_\_\_\_ No opinion.
11. What do you conclude is the explanation of the relative lack of popularity of conservation measures in the USA? (More than one answer is acceptable).  
\_\_\_\_ a. Persistence of attitudes and habits formed during pioneer abundance.  
\_\_\_\_ b. Ignorance of the rate at which resources are being exhausted.  
\_\_\_\_ c. Pressures from manufacturing and business interests to consume and discard.  
\_\_\_\_ d. Feeling of irresponsibility, since depletion "probably will not come in my time."  
\_\_\_\_ e. Belief that "science will save us."  
\_\_\_\_ f. Belief that we will practice conservation "when it becomes really necessary."  
\_\_\_\_ g. Other (specify) \_\_\_\_\_
12. To become really effective in a free society, the principles of conservation must become:  
\_\_\_\_ a. Information familiar to all the people.  
\_\_\_\_ b. An integral part of the law of the land.  
\_\_\_\_ c. Agreed upon and accepted by all groups working with natural resources.  
\_\_\_\_ d. Part of the personal beliefs and habits of every individual.  
\_\_\_\_ e. Other (specify) \_\_\_\_\_

21. Different forms of presentation may be used by teachers to arouse student interest in conservation. How do you rate the effectiveness of the following:
- a. Appeal to self-interest, i.e., conservation pays: Good\_\_\_\_, Medium\_\_\_\_, Poor\_\_\_\_.
  - b. Offer the facts of resource depletion objectively: Good\_\_\_\_, Medium\_\_\_\_, Poor\_\_\_\_.
  - c. Depict man who, though part of the natural "web of life," is continually disrupting it: Good\_\_\_\_, Medium\_\_\_\_, Poor\_\_\_\_.
  - d. Relate conservation to the experience and particular interests of each student: Good\_\_\_\_, Medium\_\_\_\_, Poor\_\_\_\_.
  - e. Stress the apparent imminence of resource depletion and its probable consequences: Good\_\_\_\_, Medium\_\_\_\_, Poor\_\_\_\_.
  - f. Others you consider good\_\_\_\_\_
22. What is your appraisal of conservation education in your institution? Note especially its strength, weakness, and needs:\_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
23. Is conservation receiving enough emphasis at your institution? Yes\_\_\_\_, No\_\_\_\_, Don't know\_\_\_\_. If not, what suggestions do you have for increasing the emphasis?
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
24. Suppose a nongovernmental agency with resources were interested in promoting the cause of conservation education at the college level. What services applied in this manner would, in your opinion, be most helpful?\_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

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- \_\_\_\_\_
- \_\_\_\_\_